Railway Age

Vol. 64. May 24, 1918 No. 21

An Improvised Light Railway Ambulance Train. British Official Photo. Copyright by Underwood & Underwood, N. Y.

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CHICAGO: Transportation Building. **CLEVELAND: Citizens Building.** **WASHINGTON: Home Life Building.**

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EDITORIAL

Railway Age

Railway Earnings and Expenses

The *Railway Age* showed in an editorial last week that the operating income of 114 railways was $90,000,000, or 60 per cent, less in the first three months of the present year than it was in the first three months of last year. Returns from 191 roads which have now been made public by the Interstate Commerce Commission make a better showing, although not much better. In the three months these roads had an increase in operating revenues of $57,400,000. The increase in their operating expenses was $162,000,000 and the increase in their taxes and uncollectible revenues was about $3,490,000. In consequence, their operating income declined from $189,900,000 to $81,600,000, making a loss in operating income compared with last year of $108,000,000, or 57 per cent. The encouraging feature of the returns is that those for March are much better than those for the entire three months. The decline in the operating income of these roads in March was only from $73,787,000 to $67,352,000, or about 9 per cent. If the results for the three months should be taken as an indication of what the earnings and expenses will be during the entire year the outlook would have to be regarded as very bad. On the other hand, if results in March may be taken as an indication of those which will be gained during the rest of the year, the outlook is very much better. In any event, however, the indications are that the tendency of operating expenses would continue to be strongly upward and that of operating income strongly downward, even if a very large advance of wages was not impending. It seems highly desirable and necessary, therefore, that steps should be taken as rapidly as possible toward an increase in rates in order to save the government from suffering a large deficit from railway operations this year.

Large Capital Expenditures Authorized

The director of the Division of Capital Expenditures of the Railroad Administration, Judge Robert S. Lovett, has authorized capital expenditures by 182 railways amounting to about $938,000,000. As was to be expected from a department headed by a man of such great experience and executive ability as Judge Lovett, the work has been handled as rapidly and wisely as was practicable in the circumstances. The newspapers have called attention to the fact that the expenditures authorized are about three times as great as those made in any of the last three years. Measured merely in terms of money this is true. Measured in terms of what money will buy, it is far from true. In the fiscal year 1915 capital expenditures were $310,500,000. The average railway wage this year will be at least 40 per cent higher than it was then, the prices of equipment will be at least 100 per cent higher and the prices of materials will average at least 50 per cent higher. The additions and betterments made and the equipment bought in 1915 for $310,000,000 would have, on the basis of present wages and prices cost about $550,000,000. Or to state the matter in another way, the facilities which can be provided now for $938,000,000 would have cost on the basis of the prices and wages of 1915, about $500,000,000. In the three years ending with 1915 the increase in investment in road and equipment averaged $457,500,000 annually and in the three years ending with 1912 it averaged $755,000,000. Making allowances for differences in wages and prices, the authorizations for this year do not provide for as great increases in facilities as those made on the average annually from 1909 to 1915, inclusive. On the other hand, they probably provide for all and more than all the increases in facilities which it will be possible to get labor, money and materials to make.

The Wage Increase and the Shop Mechanics

A more careful analysis of the report of the Railroad Wage Commission discloses the fact that there are many cases where the railway shop craftsmen and foremen will not participate in the increases recommended. During the past two years the railroads have been forced by dire necessity to periodically increase the rates of pay to this class of men in order to keep the shops fully manned. The demand for mechanics has been so great in the manufacture of war materials and ship building and the wages paid so high that many of the men have been drawn away from the railroads. Since the government has taken control of the roads, however, the immigration of the mechanics has been checked somewhat by the more or less tacit understanding that the men in the shops would be taken care of properly in the readjustment of wages. It is not to be wondered at, therefore, that expressions of dissatisfaction are heard from that quarter. The commission said: "It (the proposed scale) has its foundation in principle and not in the compelling force of any unusual competitive conditions." This, of course, is not practical, when there is such a large discrepancy between the awards made by the commission and what is being paid by industrial concerns. The ship building industry pays anywhere from 65 to 85 cents per hour for its mechanics and common laborers receive 40 cents. Munition plants pay 70 cents for machinists. Even the locomotive builders pay the craftsmen as high as 65 and 75 cents per hour. This compared with wages in the neighborhood of 50 cents an hour for mechanics and 25 cents for labor on the railroad indicates the difficulties that will be encountered as the demand of the war industries grow, unless a modification is made in the present schedule. Without doubt, the director general has observed this deficiency in the commission's report and will correct it. The fact, however, that the original report has received such wide publicity requires that prompt action be taken.

Pooling Introduced with Success in the West

The terminal problem has been receiving considerable attention of late because it is well known that a large part of the car time is consumed in railway yards and that epidemics of congestion can generally be traced to inadequate terminal and interchange facilities. Under the stress of necessity the regional director of Western railroads recently introduced a plan for handling certain commodities in solid train lots, described elsewhere in this issue, which has the advantage of eliminating terminal switching and avoiding the delays incident thereto. The plan, which was first applied to export

grain, has reduced by one-half the transit time on that traffic between the Western primary markets and the Atlantic seaboard. The innovation constitutes a pooling of traffic among initial lines and the assignment to each of all shipments on certain designated days. This method of dividing business enables a railway to assemble sufficient cars of the same commodity consigned to the same destination to handle them in solid trains. These are operated through to the point of final delivery, according to routings arranged for by the Railroad Administration in such a manner that connections alternate in participating in the movement. The plan prevents the duplication of switching by initial lines, eliminates delays in switching at junction delivery points and gives all lines involved a fair share of the business handled. Up to date the scheme has been applied to the movement of both export and domestic foodstuffs, oil originating in the "Mid-Continental field," packinghouse products, north Pacific coast lumber consigned to the government, California perishables and coast-to-coast shipments of hemp, wool and sugar. While the western regional director and his staff are to be commended for the success of the train-lot plan, this method of handling traffic is nothing more or less than pooling which was prohibited by law under the private operation of railroads. It would, therefore, be decidedly unfair to seize upon this development under federal control as an argument for government ownership. It is rather an added proof of the short-sightedness of repressive regulation, and an indication of the need for an altered policy by federal and state governments when the railways are returned to their owners.

Increasing Track Capacity on Lines Already Signaled

CONGESTION FREQUENTLY OCCURS on certain more or less limited sections of track on a division already signaled owing to a number of trains endeavoring to move over such sections at approximately the same time. It may be inadvisable or impossible to rearrange train schedules to relieve such a situation. When one or more tracks are badly congested with traffic moving in the one direction at a time when the other track or tracks used for traffic in the opposing direction are idle, or nearly so, a decided loss in capacity results and the most efficient use is not being made of all the facilities at hand.

This condition can be and is oftentimes relieved by running some trains on other tracks against the current of traffic by the issuance of train orders. Instead of lightening the burden of the train despatcher such practices add to his work, which is heavy enough under the most favorable circumstances. A study of the train sheets will indicate the time as well as the points on a division (if not already known) where the greatest congestion occurs.

The possibilities of using all tracks to capacity was early recognized by some roads. The Chicago, Burlington & Quincy has for a number of years made very good use of existing facilities by operating trains in the same direction on two tracks during certain periods when the conditions warranted, as outlined above. This practice was followed when the lines were operated under the telegraph block system. With the installation of automatic block signals, the tracks, where necessary, have been so signaled as to provide for operation in either direction on each track. Such a method not only provides for the most efficient use of existing facilities but more nearly approaches the ideal operating conditions, as trains may be run on any available track without the use of train orders or the throwing of additional work on the despatcher. Such a method of operation is recognized by the American Railway Association and is fully provided for in the standard code.

It would appear advisable for operating officers to make a careful study of their lines and where conditions exist such as outlined above their tracks might well be signaled for operation in both directions. Considering the advantages to be derived, the changing of the present signal installations for such operation would appear to offer a solution of some of the difficulties experienced at the present time. When it is considered that the first cost and the cost of maintenance of such an installation are small compared with the cost of other means of obtaining the same results the plan is deserving of careful consideration, as any increase in the capacity of existing lines means ability to move additional traffic, which is so vital at the present time.

A Large Construction Program

THE NOTE OF PESSIMISM which has pervaded most discussions of railway betterment programs for the current year should be completely dissipated by the recent announcement of capital expenditures authorized by the Railway Administration, which aggregate $937,961,318, of which $440,071,013, or nearly one-half, will be spent for additions and betterments. It has been known for some time that the division of capital expenditures had recommended extensive improvements and that some of the roads have had very large budgets approved, but it was not until now that the real magnitude of the total sum has been apparent.

The actual size of the expenditures approved on the different roads vary widely, beginning with the New York Central with a maximum appropriation of $70,000,000. There is also a wide variation in the relation of the sum authorized to the total amount of the budget submitted by the railroads, from the cases where the budget was accepted in full to the instances where nearly all of the items were eliminated. However, the same rule has been applied in all cases—the bearing of the items in question on the effectiveness of the railways as a war machine. Roundhouse and shop facilities have received primary consideration. Next in importance are increases in facilities for the movement of traffic, such as additional main tracks and yard improvements. The latter are primarily in the nature of extensions from which benefits will be secured in the shortest time. Nevertheless, the authorizations include projects for yards of unusual proportion, such as the Markham yard of the Illinois Central near Chicago. Other work has been approved where direct connection with the "winning of the war" has not been so obvious, although fundamentally just as pertinent. Among these may be mentioned the completion of grade separation projects in which the present stage of the work constitutes an obstacle to traffic. It is not surprising that extensions have been limited to $18,203,000, divided among 38 out of the total of 182 roads that are included in the budget figures quoted above.

The time required to pass upon this heavy expenditure to ascertain whether the proposed work complied with the spirit of the policy adopted by the Railway Administration has, of course, been considerable, and is one of the causes for delay in undertaking work. Another obstacle has been a lack of funds on the part of the railroads. The large decrease in net revenues has effected some reduction in the amount of cash on hand; the government has been slow in making payments on its transportation bills and only limited disbursements have been made as yet on the income guarantees under government control. However, any misapprehension on this score should be allayed by Circular No. 14, issued by Director General McAdoo with regard to the progress being made on addition and betterment work. This order indicates that the interest of the Railway Administration in these projects does not cease with an examination and

authorization of the expenditure, but that the government, in placing its stamp of approval not only sanctions the work, but definitely directs its active prosecution. Of particular importance is the director general's inquiry as to delays to work through a lack of necessary funds, with instructions for immediate reports on any financial needs for an expeditious prosecution of such work. The Railway Administration, having passed on these improvement programs, is in the possession of valuable information regarding the needs of the various roads, and the advantages to accrue in improved transportation facilities through their completion. It is to be expected, therefore, that the government will not rest with mere authorization but will give the roads ample co-operation in the supply of both men and materials necessary for successful completion.

Amalgamation of Railway Associations

THE PROGRESS IN EFFICIENCY of the railways of the United States along technical and operating lines has been very largely due to work which has been done by their associations. The most prominent among these have been the American Railway Association, the Master Mechanics' Association, the American Railway Engineering Association, the Master Car Builders' Association, the Railway Signal Association, and the Association of Railway Accounting Officers.

They have furthered progress in two general ways. First, they have handled investigations and negotiations which have had to be made in order to enable any of the railways to make progress in certain directions. Second, they have had meetings and discussions, furnished information regarding the work being done on individual railways, and adopted recommendations as to standard practice, which have enabled all the railways to benefit by all the improvements made by any of them in operating methods or physical plant.

It has been truly said of the railway associations:

> "It is a point often overlooked in discussions of Government ownership that economies of the kind attributed to consolidation under Government ownership in Prussia are made in the United States under private ownership by co-operation between the various railways. This co-operation is carried on largely through numerous national associations, composed of the railways themselves or of their officers. Some of the most important associations are international, including Canadian and other roads. The way their members, although competitors, place the results of their investigations and experience at one another's disposal without reserve and without price affords perhaps the best example of commercial free-masonry in the world. By the investigations and reports of their committees, the free and full discussions at their meetings, the recommended practice which they adopt, and their very substantial success in getting the railways to follow the practice recommended, these organizations exert a potent influence for efficiency."

There has been, however, for some years an opinion among many railway officers that the various associations did not accomplish as much as they would if, first, they were co-ordinated under the hegemony of the American Railway Association, and second, their recommendations regarding standard practice were given some kind of backing which would cause them to be more generally carried out.

Some strong objections have been urged against either subjecting the control of other associations to the American Railway Association or attempting to force individual lines to comply with the recommendations of either this or other associations. It has been objected to the plan of putting other associations under the control of the American Railway Association that the latter has been less progressive and aggressive than some of the less pretentious organizations, that it is composed chiefly of executive officers, most of whom are not technical men, and that subjection to it would be likely to hamper rather than to further the work of the technical associations. Furthermore, there has been no power directly connected with railroad management which could exercise any coercion over the individual lines. Government control has given to one central authority, the director general of railroads, the power of forcing the individual lines to adopt standards recommended by the associations; and the movement for subjecting the other associations to the control of the American Railway Association has been renewed. It is even proposed to amalgamate all the more important associations.

The *Railway Age* believes there should be more co-ordination between the activities of the various associations. It also believes that there has been too much diversity in the practice of the railways of the United States, and that when recommendations for standardizing practice which it is desirable should be uniform, have been adopted by a large preponderance of the membership of important railway associations, there is no good reason why the various lines should not be required to adopt these practices. At the same time, however, this paper strongly questions the desirability of actually amalgamating all the large associations; and it seems clear that there might be more harm done by enforcing too much standardization of practice, than has been done in the past by failure voluntarily to adopt enough of it.

The constant development of better and better practice requires much experimenting and experience; and before any practice is adopted as standard for all the railways all the different varieties of practice should be carefully studied and fully discussed. In the mechanical field this investigation and discussion can best be done by an organization of mechanical officers; in the engineering field, by an organization of engineering officers; in the signal field, by an organization of signal officers. But the organizations in the several fields cannot do their work intelligently and thoroughly unless they are allowed a large measure of autonomy. They might be able to do it well if they were changed into divisions of the American Railway Association, which met and deliberated separately, and they reported the results of their deliberations to the American Railway Association; but if they were reduced to the status of mere committees of the American Railway Association, the number of technical officers who were given an opportunity to participate in their work would be greatly curtailed, and the amount of intelligence and the breadth of experience brought to bear on the various problems to be solved would be almost proportionately reduced.

If it were desirable that practice in regard to all operating and engineering matters on all railways should be the same, the case for having all such matters handled by a single association whose recommendations would be enforced by governmental authority would be stronger. And there are numerous matters regarding which practical uniformity is desirable. It is desirable regarding such matters as train rules, safety appliances on cars, and signaling indications. Train employees constantly are shifting from one railway to another, and diversity regarding such matters as those mentioned are elements of danger. There are many kinds of practice, however, diversity in which is desirable, not as a thing good in itself, perhaps, but as a means to an end which is good, this end being progress. Manifestly, it would be desirable to have the government require all roads to conform to the best practice in everything, provided we were sure, first, what was the best practice, and second, that the government's enforced standardization of a certain kind of practice would not prevent the introduction of still better practice. If, however, it were left to a single association to adopt recommended practice along all lines for all the railways of the United States, and if the government were to require the adoption by all railways of the exact practice recommended, there would be great danger that progress in the technical development of the railways and in their operation would be hindered rather than promoted.

While it probably is desirable for closer co-ordination

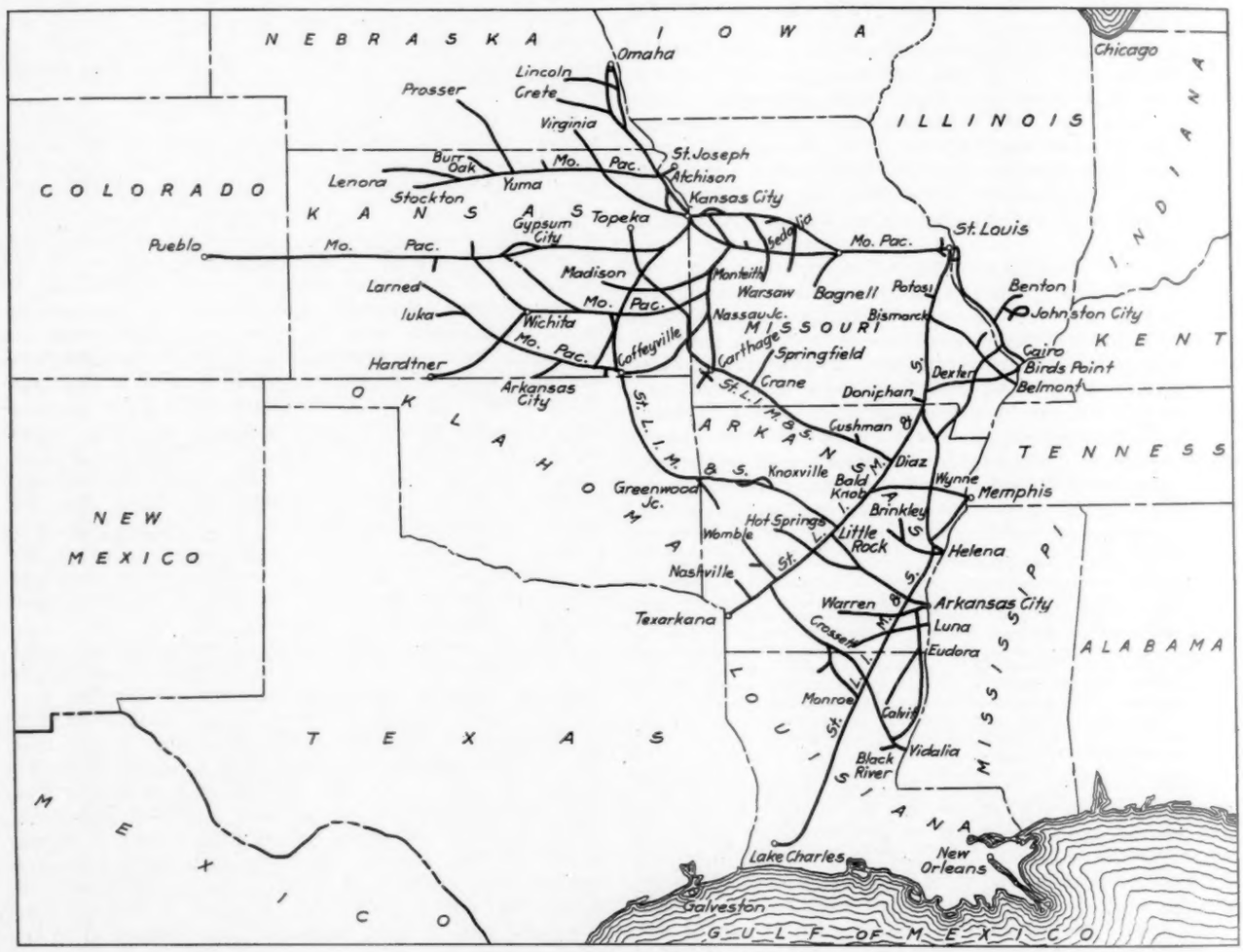
of the associations to be brought about, it is very doubtful if the revolutionary step of actually amalgamating them should be taken. It would seem that the adoption of some such plan as the following would be sufficient at present: First, make the various technical associations divisions of the American Railway Association, but let them continue to meet separately and have such discussions and adopt such recommendations as to privilege in their respective fields as they consider wise; second, give the American Railway Association authority to co-ordinate the work of the various associations so that harmony in their recommendations will be brought about where they touch upon the same general subject; as, for example, on the relation of wheel loads and strength of track, and refer back to the subsidiary organizations for further consideration recommendations of which it does not approve; and third, vest in the American Railway Association the authority and duty of making to the director general recommendations regarding the practice which it may be deemed desirable to have enforced upon all railways.

On each individual railway it is the function of the technical officers to make recommendations regarding the practice to be followed in their respective departments, and that of the executive officers to reject, or to adopt, and put into effect these recommendations. Why should not a similar general relationship exist between the organization of the various technical associations and the American Railway Association itself, which is an executive officers' organization?

Missouri Pacific

THE RESULTS OF OPERATION on the Missouri Pacific in the calendar year 1917 were in striking contrast to the financial results obtained on most of the eastern trunk line roads. With an increase of less than 12 per cent in traffic, there was an increase of over 31 per cent in gross income available for interest charges and dividends. In 1917 gross income amounted to $22,300,000, and if the reorganization plan which was actually put into operation in June had been in operation during the entire year, the Missouri Pacific would have had $10,218,000 surplus over its fixed charges, or equivalent to the full five per cent on the outstanding $71,800,100 preferred stock and to over eight per cent on the $82,839,500 common stock.

The reorganization plan which was approved of in March and put in operation in June, 1917, was generally considered a sound plan, with the possible exception of what appeared to be a rather inadequate provision of working capital. The balance sheet of June 1 showed only $1,470,000 cash on hand, with total current liabilities of $13,866,000. During the last seven months in 1917 the company strengthened its cash position to a remarkable extent. Cash on hand at the end of December amounted to $4,153,000, current liabilities having been reduced by over $400,000. This $4,153,000 would appear to be ample cash for a company doing the amount of business that the Missouri Pacific does. The need for building up a cash reserve did not apparently interfere, however, with the expenditures for additions and better-



The Missouri Pacific

ments. A total of $3,819,000 was spent for betterments, of which $1,327,000 was for improvement and additions to roadway and $2,315,000 for additions (net) to equipment.

While it is probable that when all of the annual reports for western and southwestern roads have been published it will be found that roads in that part of the country did not suffer as severely in 1917 as the trunk lines and New England roads, nevertheless. the Missouri Pacific is in a rather unique position. While the road was still being operated under B. F. Bush as receiver, a very large force of employees was built up because of the need of taking up a great deal of delayed maintenance work and, in general, of feeding up the patient which had been, prior to the receivership, pretty badly starved. When, therefore, Mr. Bush was made president of the new company the management had a well rounded out organization with which to work. Traffic was on the increase, but under the receivership adequate facilities had been provided to meet an increase in traffic, so that while the Missouri Pacific, like all the other roads, had to pay greatly increased wage rates, the management had adequate forces both for train operation, maintenance of equipment and maintenance of way at their disposal.

Total operating revenues amounted to $78,320,000 for 1917, an increase compared with 1916 of 11.93 per cent. Total operating expenses amounted to $53,248,000, an increase of 3.71 per cent. Transportation expenses amounted to $26,326,000, an increase of 21.18 per cent, which in the face of the rise in the rate of wages and the larger traffic handled, is a good showing. Maintenance of way cost $10,946,000, a decrease of 10.81 per cent, and maintenance of equipment $12,449,000, a decrease of 11.15 per cent. The explanation is, of course, that under the receivership in 1916, maintenance included very large expenditures for deferred maintenance. The Missouri Pacific management would probably say that notwithstanding the acute labor shortage it was in a position to do and actually did all of the maintenance work in 1917 that was necessary to keep the property up to the new and much higher standard which has been set for it.

The following table shows the ratio of each class of expenses to total operating revenues:

	1917	1916
Maintenance of way and structures	13.98	17.53
Maintenance of equipment	15.90	20.02
Traffic	2.16	2.48
Transportation	33.61	31.05
General	2.18	2.26
Other	0.16	0.03
Total	67.99	73.37

In 1915 8.64 per cent of the main line tracks of the Missouri Pacific was unballasted and 46.90 per cent of branch line tracks was unballasted. At the end of 1917 4.27 per cent only of main line tracks and 35.26 per cent of branch line tracks were unballasted. These figures, however, by no means give an adequate picture of the amount of rehabilitation work which has been done. Just what part of the track which was carried on the books as ballasted in 1915 had had so little renewal of ballast applied to it as to make it ballasted in theory rather than practice, it is hard to say, but there was a very considerable mileage of this kind of track. Renewal of ballast is a charge to maintenance of way expenses and a part of the very heavy maintenance expenses in 1916 was on account of work that, while technically renewal, actually cost almost as much as if there had been no ballast under the track before.

A great part of the increase in traffic which was handled by the Missouri Pacific in 1917 resulted from a much larger tonnage of bituminous coal and a larger tonnage of manufactures. The tonnage of bituminous coal carried in 1917 was 6,824,000, or 15.38 per cent more than in 1916. The tonnage of all manufactures totaled 5,352,000 tons in 1917, an increase of 20.55 per cent over the previous year. The average haul per ton in 1917 was 252 miles, in 1916 243.

There was a notable gain in train loading, the average train load in 1917 being 530 tons as against 463 tons in 1916. The average loading per loaded car was 21.55 tons in 1917, as against 19.35 tons in 1916.

The number of passengers carried one mile totaled 648,000,000 in 1917, an increase of 20.58 per cent. The mileage made by passenger trains, however, actually showed a decrease, totaling (including mixed train-miles) 12,370,000, or 1.74 per cent less than in 1916.

The table shows the figures for operation in 1917 and 1916:

	1917	1916
Average mileage operated	7,325	7,437
Freight revenue	$57,504,651	$52,622,444
Passenger revenue	14,912,673	12,031,982
Total operating revenues	78,320,313	69,972,813
Maint. of way and structures.	10,945,534	12,271,479
Maintenance of equipment	12,448,601	14,010,096
Traffic	1,691,349	1,734,745
Transportation	26,326,277	21,725,162
General	1,708,652	1,578,952
Total operating expenses	53,248,038	51,342,397
Taxes	4,220,700	3,068,800
Operating income	20,828,963	15,526,653
Gross income	22,299,877	16,970,525
Net income	8,965,104*	959,008†

*The deductions from gross income include interest on funded debt of the old company for the five months ended May 31, 1917.

†Deductions from gross income include the interest on the entire funded debt of the old company, although part of this interest was not paid, but was defaulted.

New Books

Proceedings of the American Railway Bridge & Building Association. 300 pages. Illustrated. 6 in. by 9 in. Bound in paper and cloth. Published by the Association. C. A. Lichty, Secretary, 319 North Waller avenue, Chicago. Price, $1.

This volume contains the proceedings of the twenty-seventh annual convention which was held in Chicago on October 16-18, 1917. The reports and papers which were presented at this meeting were prepared with particular reference to present day problems in the bridge and building department and with the discussions will be found to be of more than usual value to railway men confronted with the problems incident to the maintenance of bridges and other structures. Committee reports were presented on the following subjects: The Erection of Plate Girder Spans with the Least Interruption of Traffic; Repairing and Strengthening Old Masonry; Paint and Its Application to Railway Structures; The Economical Delivery of Water to Locomotives, and Fire-proofing Roofs of Wooden Buildings. Individual papers were also presented on the following subjects: Concrete Casing for the Protection of Steel Structures, by E. E. R. Tratman, western editor, Engineering News-Record, Chicago; The Organization and Operation of Bridge and Building Material Yards, by H. C. Pearce, general purchasing agent, Seaboard Air Line; The Organization and Operation of a Bridge and Building Supply Yard, by Geo. T. Richards, superintendent bridge and building shop, Chicago, Milwaukee & St. Paul, Tomah, Wis.; Shipping Company Material Economically, by J. R. Pickering, superintendent of car service, Chicago, Rock Island & Pacific, Chicago; Housing and Feeding Bridge and Building Maintenance of Way Crews, by F. E. Weise, chief clerk, engineering department, Chicago, Milwaukee & St. Paul, Chicago; Snowsheds, by Geo. W. Rear, general bridge inspector, Southern Pacific, San Francisco, Cal.; Uniform Versus Differential Rates for Bridge and Building Department Employees, by E. T. Howson, western editor, *Railway Age*, Chicago; How to Secure and Hold Bridge and Building Men, by J. P. Wood, supervisor of bridges and buildings, Pere Marquette, Saginaw, Mich.; The Material Problem, by Albert Reichman, division engineer, American Bridge Company, Chicago; and Intelligent Reclamation of Material, by C. A. Lichty, Chicago & North Western Chicago.

Letters to the Editor

The Report of the Railroad Wage Commission

New York.

To the Editor:

This document, dated April 30, 1918, and released to the press May 9, 1918, is an able one, and the investigation was made with a view to its comprehensiveness and appears to have been thorough. It has, however, the defects of its origin. It is a political document and is carefully built within the four walls of political expediency.

The trouble with the politician is that he always looks at the problem of industrial organization from the "one man, one vote" standpoint. He never visualizes the industrial organization in its functioning—an activity in which one man as a manager may easily equal in potency one thousand men as workers, in which $1,000 of capital in dynamic plant energy may easily equal in potency many times that value in human dynamic energy. In passing upon the rewards of these three contributing efforts, the views expressed are not especially illuminating.

The entire argument rests on the cost of living. The commission takes cognizance of two things:

(1) That the cost of living has increased disproportionately among those of small incomes, and

(2) That there is a point up to which it is essential that the full increased cost shall be allowed as a wage increase, while from this point on the increase may be gradually diminished . . . . because the opportunity for substitution and other methods of thrift decline almost to the vanishing point.

In view of the emphasis placed upon this point, the findings of the investigators, Hathaway and Bowen, are interesting; that is, they find the increase in the cost of living as applied to men receiving incomes up to $600 per year has been 43 per cent, to men receiving up to $2,000 40 per cent; in other words, that the compressibility of the expenses of the $2,000 man as compared with that of the $600 man shows an advantage of only 3 per cent. This can hardly be the common experience.

No changes are recommended in wages above $250 per month and no hint is given of the real decrease in wages and salaries above that amount through the incidents of the income tax, the sur-tax, the excess profits tax, etc.

The commission criticises the slowness of the railroads in yielding to increase in wages, but it does not call attention to the reason therefor, which was the strangulation to which the roads were subjected through their rates being held inflexible by the commissions. Attention is called to the fact that such advances as were made were not in any way uniform, but the report does not dwell particularly upon the activities of the brotherhoods and not at all upon the activities of the President and the Congress in the passage of the Adamson law.

One noticeable feature of the report is that it applies to all employees and goes back for its foundation to the conditions existing on December 31, 1915. Thus, at one stroke, the government wipes out everything for which the unions fought; that is, their separatist advantages. This as to the future does not seek wholly to rectify the inequalities of the past, not even going so far as to suggest that having laid down the rule that the wage goes with the place and having fixed a wage for the place, that if the present incumbent was receiving a wage in excess of the standard and if, in indulgence, he were allowed to continue in his position, his successor in taking the place should do so at the standard wage.

Such compensations, these commissioners suggest, "have been attained by the most compact and complete organizations, handled with a full appreciation of all strategic values." Had their statisticians reviewed the history of wages in the last forty years they would have seen how valueless have been these organized efforts as against the law of supply and demand. The fact is that unorganized common labor has fared equally well if the wages of today are compared with those of, say, 1880.

"Reductions in hours are not to be regarded as increases in pay." So much in apology for the history of the past! The basic eight-hour day, with its increase of 37½ per cent in wages (where the hours worked are maintained, but the basic day and its overtime are applied) has attractions that are well understood by all that are in direct contact with the situation.

The political aspects of the matter are further accentuated by the entire failure to report or condemn uneconomic practices—the maintenance of parasitic labor, as in the full crew requirements, too many men in freight and passenger pools, the limitation of output, as in the prohibition of operating double-headed trains in territory west of the Mississippi river, limitations in the number of apprentices, and many other similar examples of the false philosophy of labor unionism.

It is not unexpected that in contrast with this silence they should markedly call attention to the salaries of officials, some of which they say "may well be abolished altogether, others greatly reduced."

"Our system of railroads (they say) and our method of railroading are regarded as the model for the world, excelling all other public or private systems elsewhere. For our needs and for our pride this standard of superiority must be maintained." But no words of recognition of the great names of the past nor of the ability and the devotion of the names now on the official roster are found in this report. Here the report descends to demagogy.

A Friend of the Younger Railroad Officer.

"Curses and Courtesy"

Chicago.

To the Editor:

I have noted in your issue of January 18 the article signed "Nemesis."

I wondered what the idea was. Is any individual who happens to be able to write, to be allowed to accuse railway men of customarily transacting their business by cursing? There does not seem to be, on analysis, anything but imagination in what is said in the article, but it is run as a statement of facts.

F. H. Rutherford,
Superintendent Terminals, Chicago & Eastern Illinois.

[The letter entitled "Curses and Courtesy," which appeared in our issue for January 18 and to which Mr. Rutherford refers, was published because it was written by a railway officer who perhaps meant to describe only how business is conducted in his immediate environment. If his letter was meant as a description of the way in which railway operation generally is conducted it was, acording to our observation, inaccurate and unjust. There is a great deal of profanity spilled in the operation of the railways of the United States, but it is no greater in proportion than the amount spilled in running any other line of business. It would be entirely unjust to imply that railway men, as a class, are peculiarly addicted to profanity.—Editor.]

A Billion Dollars for Capital Improvements

Railroad Administration Announces Railroad Budgets That Have Been Tentatively Approved

WASHINGTON, D. C.

BUDGETS made up by the railroads for improvements and extensions during 1918 aggregating a capital expenditure of $937,961,318 have been approved by the Railroad Administration, through the division of Capital Expenditures. The total includes $440,071,013 for additions and betterments, $479,686,531 for equipment, and $18,203,774 for extensions. Proposed expenditures aggregating $349,247,828 were eliminated in the revision of the budgets by the regional directors and the division of Capital Expenditures.

A list of the expenditures approved by roads divided between additions and betterments, equipment and extensions, together with the amounts eliminated, is given in the accompanying table given out on May 18. The list was accompanied by an explanatory statement as follows:

"The attached budgets were made up by the carriers in response to a letter of instructions issued by Director General McAdoo, which contained the following:

" 'In determining what additions and betterments, including equipment, and what road extensions, should be treated as necessary, and what work already entered upon should be suspended, please be guided by the following general principles:

" 'From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material, it is likewise highly important that this supply shall not be absorbed except for the necessary purpose mentioned in the preceding sentence.

" 'Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company, may not be equally meritorious or necessary under existing conditions when the government has possession and control of railroads generally and therefore when facilities heretofore subject to the exclusive control of the separate companies are now available for common use whenever such common use will promote the movement of traffic.'

"If these instructions were followed, the estimates should be conservative. Nevertheless they were carefully revised and further reduced, as shown by this statement.

"The approval of these budgets is necessarily tentative. It was necessary to ascertain as speedily as possible what improvements were required and the probable cost, and grant authority to proceed with those most urgent, so that the work could be done promptly and before next winter. The subject is still under careful study, with a view to postponing or canceling any work which can reasonably be deferred; and the financial condition of the carriers and their ability to repay the money borrowed will require curtailment in many cases. On the other hand, it is certain that there will be considerable additions from time to time to the amounts required for particular improvements, which were not foreseen when the budgets were prepared. But on the whole, the figures given in the statement are as definite and accurate as it is possible for any estimates for such vast and varied work to be."

The total of $479,000,000 for equipment includes the estimates of the various companies as to their requirements for the year, as revised, including equipment contracted for but not yet delivered or paid for. If the roads are supplied from the cars and locomotives ordered by the government the cost will be charged against the authorized expenditure, so the total for equipment is not to be added to the expenditure of the government for equipment. As new cars and locomotives are charged to capital account while the cost of cars or locomotives which may be retired are written off the accounts, the figure $479,000,000 represents the estimated expenditure for new equipment, regardless of any amount that may be written off for retirement. In the case of additions and betterments in the case of a facility that is retired, the figures given in the table represent the increase in the cost of the new facility over the cost or estimated value of the facility retired. In a circular addressed to the roads giving instructions as to the preparations of their reports it was stated that the information desired was as to the new money required in connection with the improvement rather than the manner in which the transactions are dealt with on the carriers' books.

Because the authorizations are more or less tentative, a further subdivision showing the detailed expenditures to be made is not yet available.

The asterisks in the table opposite the names of certain roads indicates that these budgets are still subject to revision, but the figures in general indicate an intention on the part of the Railroad Administration to allow the roads to make capital expenditures approximately three times as great as the average of the amounts so expended in the last three years, although the figures cannot be exactly compared with the increases in property investment as reported by the Interstate Commerce Commission.

The figures also indicate that the Railroad Administration is not encouraging many extensions of lines except for the completion of projects already under construction. The total for extensions, over $18,000,000, is apportioned among 38 roads and in only eleven cases has more than $500,000 for any road been approved. Of the total nearly $7,000,000 is for the Pennsylvania System. The greater part of the additions and betterments approved are on the eastern lines where the heaviest traffic is being concentrated.

The cases in which the greatest eliminations were made were those of the Chicago Union Station Company, whose estimate was reduced by $19,043,430 to $1,655,293; the Norfolk & Western, whose figures were reduced by $20,755,200; the Pennsylvania Western Lines, reduced $22,356,128, and the Southern Railway, reduced $46,916,950.

Rules to be observed with respect to all railroad work involving charges to capital account were prescribed in General Order No. 12 issued by Director General McAdoo on March 21, which authorized the director of the Division of Capital Expenditures, R. S. Lovett, to issue such regulations and instructions and to prescribe such forms and require such reports as might be necessary to carry out the order. The reports which Judge Lovett's department asked were sent to the regional directors for their recommendations and to Judge Lovett's office for final approval. After most of the budgets had been passed upon Circular No. 25 was addressed to the roads directing them to report at once to the regional directors and to the Division of Capital Expenditures as to whether they were proceeding with all practicable expedition to construct and put into operation all additions and betterments approved, with the reasons why

in case the work was not being vigorously prosecuted.

In case the carrier did not have on hand or had not arranged for the necessary funds, and if it anticipated that this condition was likely to delay any of the work, the carrier was directed to make a report at once to the director of the Division of Finance, stating its financial needs to complete all approved work expeditiously. Wherever possible, it is expected that railroads will finance their own work but if necessary the government may purchase the securities issued therefor. It may also make advances to the roads from its revolving fund, which consists of an appropriation of $500,000,000 and any surplus earnings of the carriers, or advances may be made through banks or directly by the War Finance Corporation.

The New York Central's Budget

The New York Central's total of $70,672,087 allowed for capital expenditures, is the largest for any road and the total for the entire New York Central system, approximately $163,000,000, exceeds the total for any other system. From its budget as submittetd to the Railroad Administration, the New York Central proper had only $41,000 eliminated and

BUDGETS FOR 1918.

Name of railroads	Total capital expenditures approved: Additions and betterments	Equipment	Extensions	Total	Eliminations
Akron & Barberton Belt	$29,870	.....	.....	$29,870	.....
Akron Union Passenger Depot Co	.....	.....	.....	.....	$534,000
Alabama & Vicksburg	210,768	$439,525	.....	650,293	.....
Alabama Great Soutnern	1,062,092	.....	.....	1,062,092	685,787
Ann Arbor*	195,684	1,955,285	.....	2,150,969	147,852
Arkansas & Memphis Ry. Br. & Tr. Co	67,500	.....	.....	67,500	.....
Arizona & New Mexico	59,250	.....	.....	59,250	25,000
Atchison Topeka & Santa Fe	17,757,647	23,007,137	$701,000	41,465,784	9,684,037
Atlanta & West Point	318,326	189,944	.....	508,270	100,000
Atlanta, Birmingham & Atlantic*	354,396	1,010,500	.....	1,364,896	24,190
Atlanta Terminal Co	74,000	.....	.....	74,000	.....
Atlantic Coast Line	2,823,959	7,328,177	143,656	10,295,792	4,871,428
Baltimore & Ohio	16,022,171	27,336,132	450,000	43,808,303	2,454,302
Baltimore & Ohio Chicago Terminal	274,775	8,850	.....	283,625	573,101
Baltimore, Chesapeake & Atlantic*	14,500	24,700	.....	39,200	28,500
Bangor & Aroostook	207,778	889,315	.....	1,097,093	109,461
Bessemer & Lake Erie	850,074	138,654	121,525	1,110,253	1,557,364
Boston & Albany	2,199,400	1,587,579	.....	3,786,979	.....
Boston & Maine*	8,948,648	13,359,761	.....	22,308,409	4,645,163
Buffalo Rochester & Pittsburgh	1,738,047	2,418,612	.....	4,156,659	.....
Carolina, Clinchfield & Ohio	398,475	4,492,750	.....	4,891,225	4,378,500
Central of Georgia	1,514,678	1,636,200	.....	3,150,878	471,370
Central New England	864,305	24,000	.....	888,305	45,000
Central of New Jersey	7,457,647	8,768,800	.....	16,226,447	5,173,334
Central Vermont*	474,382	268,473	.....	742,855	5,032,500
Charleston & Western Carolina	275,000	.....	.....	275,000	199,982
Chesapeake & Ohio	7,028,094	10,877,996	500,631	18,406,721	3,059,381
Chicago & Alton	1,060,542	578,793	.....	1,639,335	9,219,000
Chicago & Eastern Illinois*	2,185,488	2,123,209	.....	4,308,697	168,000
Chicago & North Western	7,570,832	3,640,520	.....	11,211,352	154,000
Chicago & Western Ind. & Belt Ry. of Chicago	621,000	390,688	.....	1,011,688	4,959,000
Chicago, Burlington & Quincy	6,246,638	6,599,200	.....	12,845,838	6,749,349
Chicago Great Western	755,571	330,710	.....	1,086,281	4,817,500
Chicago Junction	60,000	31,815	.....	91,815	560,000
Chicago, Milwaukee & St. Paul	12,636,650	9,848,003	642,000	23,126,653	4,060,705
Chicago, Peoria & St. Louis	37,314	11,595	.....	48,909	404,000
Chicago, Rock Island & Pacific*	8,248,605	5,950,431	.....	14,199,036	16,832,225
Chicago, St. Paul, Minneapolis & Omaha	986,324	1,310,333	.....	2,296,657	4,240
Chicago Union Station Co	1,655,293	.....	.....	1,655,293	19,043,430
Cincinnati, Indianapolis & Western	333,881	330,525	40,165	704,571	22,958
Cincinnati, New Orleans & Texas Pacific	5,415,994	619,750	.....	6,035,744	838,775
Cincinnati Northern	319,800	69,545	.....	389,345	.....
Cleveland, Cincinnati, Chicago & St. Louis	10,117,796	12,044,211	.....	22,162,007	3,115,288
Colorado & Southern	256,370	1,614,648	.....	1,871,018	.....
Colorado & Wyoming	167,000	200,000	.....	367,000	.....
Cumberland Valley	1,280,961	670,272	.....	1,953,233	24,279
Davenport, Rock Island & Northern	3,300	.....	.....	3,300	84,000
Dayton Union	3,000	.....	.....	3,000	.....
Delaware & Hudson	1,196,659	1,961,954	.....	3,158,613	1,492,161
Delaware, Lackawanna & Western	1,835,118	1,597,692	.....	3,432,810	139,765
Denver & Rio Grande	2,422,668	363,694	62,179	2,848,541	8,041,617
Denver Union Terminal	6,602	.....	.....	6,602	.....
Detroit & Toledo Shore Line	70,206	2,008,500	.....	2,078,706	.....
Detroit Terminal	216,332	140,000	.....	356,332	.....
Duluth & Iron Range	437,090	789,316	6,734	1,233,140	.....
Duluth, Missabe & Northern	2,120,218	917,855	.....	3,038,073	.....
Duluth, South Shore & Atlantic	74,885	.....	.....	74,885	.....
East St. Louis Connecting	225,737	2,625	.....	228,362	.....
Elgin, Joliet & Eastern	696,960	1,053,052	.....	1,750,012	.....
El Paso & Southwestern System	860,816	2,445,856	23,259	3,329,931	714,318
Erie	9,799,262	14,794,178	.....	24,593,440	22,000
Florida East Coast	999,307	742,590	.....	1,741,897	.....
Fort Worth & Denver City	260,138	444,415	.....	704,553	1,428
Georgia R. R. Lessee Corporation	168,017	898,750	.....	1,066,767	.....
Georgia Southern & Florida	45,505	11,750	.....	57,255	120,000
Grand Rapids & Indiana	130,912	1,331,100	.....	1,462,012	69,346
Great Northern	9,510,600	4,622,388	450,000	14,582,988	.....
Gulf & Ship Island	106,000	389,820	154,406	650,226	152,498
Gulf & Coast Lines	194,308	35,200	27,800	257,308	761,619
Gulf, Colorado & Santa Fe	2,469,408	6,865	.....	2,476,263	526,310
Gulf, Mobile & Northern	957,374	40,000	911,024	1,908,398	410,000
Hocking Valley	3,622,043	2,046,998	.....	5,669,041	4,759,000
Hudson River Connecting	2,000,000	.....	.....	2,000,000	.....
Illinois Central	10,660,251	15,720,397	325,000	26,705,648	7,152,462
Indiana Harbor Belt	513,300	1,150,547	.....	2,063,847	.....
Indianapolis Union	1,198,179	160,000	.....	1,358,179	3,668,038
International & Great Northern	507,520	489,947	.....	997,467	1,410,000
Kansas City Southern	1,204,279	1,026,899	.....	2,231,178	902,898
Kansas City Terminal	1,669,130	4,300	.....	1,673,430	1,562,600
Kentucky & Indiana Terminal	655,900	325,060	.....	980,960	.....

Name of railroads	Total capital expenditures approved: Additions and betterments	Equipment	Extensions	Total	Eliminations
Lake Erie & Western	1,133,600	2,237,250	.....	3,370,850	1,011,600
Lehigh & New England	223,270	636,671	424,100	1,284,041	.....
Lehigh & Hudson River	59,306	202,640	.....	261,946	.....
Lehigh Valley	5,773,247	4,210,561	5,000	9,988,808	17,099,950
Long Island	1,193,990	1,076,773	.....	2,270,763	3,025,922
Los Angeles & Salt Lake	785,758	1,084,996	.....	1,870,754	619,492
Louisiana & Arkansas	4,498	3,400	.....	7,898	.....
Louisville & Jeffersonville Br. & R. R.	95,000	60,000	.....	155,000	2,000
Louisville & Nashville	5,944,013	5,768,225	976,035	12,688,273	623,054
Louisville, Henderson & St. Louis	128,913	259,690	.....	388,603	23,500
Mahoning Coal	1,301,275	.....	.....	1,301,275	.....
Maine Central	460,122	2,011,900	.....	2,472,022	1,000,000
Memphis Union Station	5,000	.....	.....	5,000	.....
Michigan Central	4,426,225	15,601,332	.....	20,027,557	598,500
Midland Valley	150,000	70,080	.....	220,000	355,000
Minneapolis & St. Louis	412,625	378,638	.....	791,263	2,727,975
Minneapolis, St. Paul & Sault Ste. Marie	1,141,166	137,084	.....	1,278,250	2,000,000
Missouri & North Arkansas*	73,114	9,733	.....	82,847	144,810
Missouri, Kansas & Texas*	1,453,327	2,539,498	.....	3,992,825	1,597,894
Missouri, Kansas & Texas of Texas*	895,378	48,875	.....	944,253	2,745,518
Missouri, Oklahoma & Gulf*	61,443	.....	.....	61,443	2,056,032
Missouri Pacific	2,394,509	7,517,050	15,000	9,926,559	326,000
Mobile & Ohio	352,914	400,000	.....	752,914	2,778,650
Nashville, Chattanooga & St. Louis	1,272,338	1,441,067	559,141	3,272,546	.....
Natchez & Southern	9,842	.....	.....	9,842	.....
New Orleans & Northeastern	515,923	487,550	.....	1,003,473	1,990,000
New Orleans Great Northern	116,645	5,192	.....	121,837	17,000
New York Central	32,428,693	38,168,394	75,000	70,672,087	41,000
New York, Chicago & St. Louis	1,362,538	2,601,120	628,200	4,591,858	1,355,551
New York Connecting	1,217,767	.....	.....	1,217,767	.....
New York, New Haven & Hartford	14,713,919	9,602,010	.....	24,315,929	4,248,052
New York, Ontario & Western	140,448	72,931	.....	213,379	18,800
Norfolk & Portsmouth Belt Line	292,500	212,282	180,000	684,782	.....
Norfolk & Western	8,888,167	14,639,057	135,000	23,662,224	20,755,200
Norfolk Southern*	690,000	569,334	77,000	1,336,334	977,000
Northern Pacific	5,146,123	8,678,757	235,000	14,059,880	6,068,778
Northern Pacific Terminal Company	501	.....	.....	501	.....
Northwestern Pacific	416,320	583,095	.....	999,415	.....
Panhandle & Santa Fe	501,125	.....	.....	501,125	19,019
Pennsylvania (Lines East)	37,658,917	21,198,116	5,531,710	64,388,743	14,258,469
Pennsylvania (Lines West)	27,966,754	19,057,655	1,243,500	48,267,909	22,356,128
Pennsylvania Terminal	150,000	.....	.....	150,000	.....
Pere Marquette*	3,977,759	4,441,782	.....	8,419,541	134,170
Philadelphia & Reading	13,386,387	11,532,276	.....	24,918,663	9,670,741
Pittsburgh & Lake Erie	4,587,700	4,120,497	.....	8,708,197	.....
Pittsburgh & Shawmut	430,989	116,914	.....	547,903	337,162
Portland Terminal Company	207,544	78,140	.....	285,684	.....
Richmond, Fredericksburg & Potomac	782,292	1,163,920	.....	1,946,212	161,000
Rutland	499,250	439,168	.....	938,418	55,000
St. Joseph & Grand Island	318,341	17,163	.....	335,504	29,746
St. Louis-San Francisco	5,709,397	1,661,533	.....	7,370,930	126,000
St. Louis Southwestern	630,105	1,401,325	.....	2,031,430	408,431
St. Louis Southwestern of Texas	644,472	.....	.....	644,472	584,360
St. Paul Union Depot	1,400,000	.....	.....	1,400,000	.....
San Antonio & Aransas Pass.*	79,900	8,852	.....	88,752	3,978,048
Seaboard Air Line	2,961,101	5,596,622	153,000	8,710,723	4,694,000
Sioux City Terminal	174,082	.....	.....	174,082	.....
Spokane & Inland Empire	64,115	.....	.....	64,115	.....
Spokane International*	77,050	3,511	.....	80,561	.....
Spokane, Portland & Seattle	386,543	102,299	.....	488,842	26,840
Staten Island Rapid Transit	651,632	.....	.....	651,632	.....
Southern Pacific System—					
Arizona Eastern	258,070	281,370	.....	539,440	28,480
Galveston, Harrisburg & San Antonio	1,698,608	1,969,760	426,798	4,095,166	.....
Houston & Texas Central	311,766	714,779	899,866	1,926,411	502,400
Houston, East & West Texas / Houston & Shreveport	11,622	1,255	.....	12,877	.....
Louisiana Western	155,477	5,660	.....	161,137	.....
Morgan's Louisiana & Texas	240,839	209,977	.....	450,836	.....
Southern Pacific Company—Pacific System	7,081,671	14,477,718	287,667	21,847,056	2,893,978
Texas & New Orleans	392,222	7,991	.....	400,213	73,400
Southern	11,636,684	17,476,827	.....	29,113,511	46,916,950
Southern of Mississippi	29,631	.....	.....	29,631	.....
Tennessee Central	80,770	.....	.....	80,770	240,000
Terminal R. R. Association of St. Louis	47,490	1,386,847	.....	1,434,337	.....
Texas & Pacific	3,117,559	3,037,852	.....	6,155,411	569,653
Toledo & Ohio Central	1,308,141	4,480,111	737,775	6,526,027	.....
Toledo, Peoria & Western	15,000	.....	.....	15,000	933,633
Toledo, St. Louis & Western	714,134	3,767,500	.....	4,481,634	.....
Toledo Terminal	57,564	116,400	.....	173,964	.....
Trans-Mississippi Terminal*	206,934	.....	.....	206,934	.....
Ulster & Delaware	52,073	.....	.....	52,073	.....
Union Pacific System—					
Oregon Short Line	1,422,756	940,700	361,283	2,724,739	918,856
Oregon-Washington Railroad & Navigation Co.	1,347,162	507,734	378,468	2,233,364	420,108
Union Pacific R. R.	13,320,690	12,040,949	77,408	25,439,047	3,058,527
Utah	18,000	275,000	.....	293,000	.....
Vicksburg, Shreveport & Pacific	154,988	284,500	.....	439,488	.....
Virginian	4,386,150	4,007,693	237,444	8,631,287	13,100,000
Washington Southern	39,232	370,650	.....	409,882	21,000
Western Pacific	977,024	4,149,133	.....	5,126,157	1,297,675
Western Railway of Alabama	55,000	257,870	.....	312,870	177,816
Wheeling & Lake Erie	634,872	8,595,546	.....	9,230,418	126,000
Wichita Valley	31,155	1,172	.....	32,327	29,400
Yazoo & Mississippi Valley	3,166,484	16,513	.....	3,182,997	.....
Buffalo & Susquehanna	18,218	.....	.....	18,218	.....
Buffalo Creek	34,836	.....	.....	34,836	.....
Charleston Union Station	25,000	.....	.....	25,000	.....
Chattanooga Station	20,000	.....	.....	20,000	.....
Dallas Terminal & Union Depot	2,323	.....	.....	2,323	.....
Fort Worth Belt	24,000	.....	.....	24,000	.....
St. Louis Transfer	.....	1,750	.....	1,750	.....
Union Terminal	17,080	.....	.....	17,080	.....
Wichita Falls & Northwestern*	.....	.....	.....	.....	39,218
Wilkes-Barre Connecting	13,367	.....	.....	13,367	91,281
Total (182)	$440,071,013	$479,686,531	$18,203,774	$937,961,318	$349,247,828

*Subject to change.

the total eliminations for the entire system figure up only to less than $5,000,000, of which $3,115,288 was taken off the total for the Cleveland, Cincinnati, Chicago & St. Louis.

In view of these facts it is interesting to see how the total for the New York Central Railroad proper was divided:

	Chargeable to investment account	Chargeable to operating expenses	Total
I. Equipment:			
Locomotives—			
Contracted for	$8,731,800	.....	$8,731,000
Not authorized but necessary in 1918	9,340,400	.....	9,340,400
Freight cars—			
Contracted for	265,634	.....	265,634
Not authorized but necessary in 1918	8,600,000	.....	8,600,000
Passenger cars—			
Contracted for	3,112,808	.....	3,112,808
Not authorized but necessary in 1918	2,274,000	.....	2,274,000
Betterments to equipment—			
Locomotives	521,239	$273,290	794,529
Freight cars	1,844,734	3,225,007	5,069,741
Passenger cars	228,579	142,388	370,967
Total equipment	$38,168,394	$3,640,685	$41,809,079
II-1. Additions and betterments necessary for efficiency:			
(1) Contracted for	$1,243,046	$104,254	$1,347,300
(2) Authorized but not contracted for	703,185	1,445,734	2,148,919
(3) Not authorized but necessary in 1918	13,950,650	2,508,757	16,459,407
II-2. Additions and betterments necessary, but not primarily for efficiency, etc.:			
(1) Contracted for	.....	.....	.....
(2) Authorized but not contracted for	821	29	850
(3) Not authorized but nec.	99,500	14,000	113,500
II-3. Necessary road extensions	.....	.....	.....
	$15,997,202	$4,072,774	$20,069,976
III-a. Additions and betterments (exclusive of equipment) inaugurated prior to December 28, 1917, which has not been completed, and which are necessary to increase carriers' efficiency, economy or capacity	$14,247,871	$5,902,135	$20,150,006
III-b. Same—which are not primarily calculated to increase efficiency, etc.	2,224,620	265,030	2,489,650
III-c. Road extensions and new branches and lines inaugurated prior to December 28, 1917	75,000	.....	75,000
	$70,713,087	$13,880,624	$84,593,711
Less part that can and will be suspended	41,000	.....	41,000
	$70,672,087	$13,880,624	$84,552,711

Of the total of $70,672,087 which may be charged to investment account $61,015,887 is for the lines east of Buffalo. All of the equipment is charged to the lines east, no separate return for the equipment for the lines west having been included.

Equipment.—In the budget of over $38,000,000 for equipment it is noted that the road now has on order 226 locomotives costing $8,731,800, delivery on which is expected at various times throughout the year, even as late as December. Additional locomotives to the number of 171 costing $9,340,000 are required this year.

The road has only 263 freight cars costing $265,634 on order, but the budget as approved allows it to place additional orders for 1,000 box and 2,000 coal cars costing $3,000,000 and $5,600,000, respectively.

The passenger cars on order total 173, costing $3,112,808. The budget allows the placing of additional orders for 50 coaches, 50 baggage and 10 milk cars, a total of 120, at a cost of $2,274,000.

Other equipment now on order totals only 4 units, costing but $22,200. The budget approves the placing of orders for 626 additional units costing $3,227,000, including among other things 300 coal and ballast cars costing $1,500,000; a ferryboat costing $450,000; three tugs worth $450,000, and 20 covered barges worth $360,000, etc.

Among the additions and betterments for the lines east of Buffalo classified under II as necessary for efficiency, are the following, the items quoted here being chosen from a list of several hundred as being among the more important.

Syracuse.—A 30-stall engine house, costing $900,000, including $540,000 chargeable to investment account and $360,000 to operating expenses.

East Buffalo.—Shop improvements, $550,000.

Depew.—Gardenville branch connection, $500,000.

Watertown.—A 30-stall engine house, coal trestle, etc., $900,000.

Avis.—Boilers for generating plant, shop extensions, etc., $855,000.

Under the head of track work at various points on the road appears the sum of $638,150, all but $67,000 of which is to be charged to investment account.

Buildings will call for an expenditure of $512,500.

An item of $216,000 appears for coaling plants.

Signals will call for a total expenditure of $1,337,400, of which $997,900 will be chargeable to investment account and $340,500 to operating expenses. The several items are as follows:

Automatic signals, Little Falls to Fonda, $321,000, and Buffalo Belt Line, $72,000.

Interlocking, Syracuse Junction, $282,000; two towers at Rochester, one $222,000, the other $127,500.

Miscellaneous automatic signal and interlocking work, $312,900.

Under the head of III-a—projects already under way, the completion of which is necessary for the carrier's efficiency, etc.,—appear the following important items chosen also from a list of several hundred.

Belle Isle Engine Terminal.—Now 40 per cent completed; $600,000 required for 1918.

Gardenville Engine Terminal.—Also 40 per cent completed; $1,400,000 required.

Tonawanda, realinement, etc., made necessary by Barge Canal construction.—20 per cent completed. Required in 1918, $1,437,000.

Rail.—The 1918 program calls for 62,190 tons costing $2,576,600, nearly all chargeable to operating expenses.

Grand Central Terminal.—For this project there are a large number of comparatively small items which it is desired to carry out in 1918, some in the way of improvements which will increase the rentals of stores, etc, at the terminal, some required for the convenience of the public, some by city requirements, etc. For these purposes $695,750 is permitted under III-a (necessary for the carrier's efficiency, economy and capacity) and $1,262,750 under III-b (not primarily necessary for efficiency).

The only amount for new extensions either asked for or allowed in the entire budget is under III-c—projects inaugurated prior to December 28, 1917, and is for only $75,000. It covers the expenses for 1918 for the Beach Creek Extension Railroad which the New York Central is planning to build along the south side of the Susquehanna River from Keating, Pa., to Browns, a line which will eventually be 47 miles long, will cost from $6,000,000 to $8,000,000 and will be an important link in the road's soft coal traffic. Between the points in question the New York Central is now using the Pennsylvania Railroad under trackage rights.

Lines West of Buffalo.—Several important projects are called for on the lines west at Buffalo.

Under II-1.—Improvements at Collinwood, $615,000.

At Cleveland, $267,000.

A new yard at Minerva, $500,000.

Extension of yards at Elkhart, $279,000.

Machine tools for various shops, $480,000.

Under III-a.—New yard at Dock Junction to handle increased traffic at Erie. Now 30 per cent completed, $432,000 required in 1918.

Improvements in freight facilities at Cleveland now 80 per cent completed, $2,000,000 required.

Under the head of track materials for the lines west appears the total of $2,644,000, of which $1,713,000 is chargeable to operating expenses. The lines west ordered 30,000 tons of rails in 1917 but obtained only 24,000. The 6,000 tons is added to the 1918 program, making 36,000.

In reference to ballast the budget for the lines west states:

"Our program for 1918 is considerably below normal and represents the minimum amount necessary to keep our main tracks in safe operating condition."

Railroads To Be Operated By Federal Managers

This Step Taken by Director General McAdoo in Belief That No Man Can Serve Two Masters

DIRECTOR GENERAL MCADOO has announced a plan for placing the operation of each railroad in the hands of a federal manager to be appointed by and to be directly responsible to the Railroad Administration, reporting to the regional directors and displacing so far as authority for operation is concerned the presidents of the roads except as some of them may be appointed federal managers. The appointments of federal managers, except in one instance, have not yet been made. They will be chosen as far as practicable from operating officers of the particular properties involved and in most instances will probably be operating vice-presidents. The presidents who are displaced will thus be left free to represent the corporations with responsibility to stockholders and directors and their compensation will be charged to corporate funds, rather than to operating expenses. The plan as announced also includes further subdivision of the eastern region into districts and the creation of two additional regions, and a similar plan is expected to be adopted in other parts of the country.

Announcement of the plan which has been under contemplation for some time was made by the director general in a statement issued Tuesday night as follows:

"In view of the direct responsibility for the operation of the railroads of the country placed upon Director General McAdoo by the act of Congress and by the proclamations of the President, he has been unable to escape the conclusion that it will be advisable to place in direct charge of each property for operating purposes a representative, to be known as the Federal Manager, who will report to the Regional Director. As far as practicable, this Federal Manager will be chosen from the operating officers of the particular property, who are therefore entirely familiar with its employees and with its conditions.

"Except so far as may be necessary to meet the emergency conditions which compel the government to take control of the railroads, the Federal Manager of each railroad will endeavor to avail himself to the fullest extent of the advantages incident to the operation of the particular railroad as a unit and the preservation of its identity. This is believed to be of essential importance, not only to secure the best results during the period of government control, but also to give the greatest degree of reassurance to the officers and employees that the railroad careers upon which they have entered will not be narrowed, but, if anything, will be broadened, and to give the greatest possible reassurance to the stockholders that their just interests in the properties will be respected and that nothing will be needlessly done to have even the appearance of impairing their just rights.

"While in this way the responsibility for the operation of the property will be directly to the Regional Directors, and not to the boards of directors, it is the purpose of the Director General to accord to the boards of directors and their representatives the fullest opportunity to keep advised as to the operation and improvement of the properties and to maintain with the Director General and the Regional Directors the fullest interchange of views as to what is in the best interest of the government and of the stockholders.

"In the development of this policy the Regional Directors, and also the Federal Managers, will be required to sever their official relations with the particular companies and to become exclusive representatives of the United States Railroad Administration.

"The first moves in the inauguration of this policy will be through the creation of two new regions, to be known as the 'Allegheny region' and the 'Pocahontas region.'

"The Allegheny region will consist, broadly, of the Pennsylvania lines east of and including Pittsburgh and Erie; Baltimore & Ohio, east of Pittsburgh and the Ohio river, including Pittsburgh terminals; Bessemer & Lake Erie Railroad, Cumberland Valley Railroad, Central Railroad of New Jersey, Coal & Coke Railroad, Philadelphia & Reading Railway, Western Maryland Railway, Cumberland & Pennsylvania, and Pittsburgh & Lake Erie. This region will be placed in charge of C. H. Markham as Regional Director (who has resigned his connections with the Illinois Central and other companies), who will have offices in Philadelphia.

"The Pocahontas region will consist of the Chesapeake & Ohio Railway east of Columbus, Cincinnati, and Louisville; the Norfolk & Western Railway, and the Virginian Railway, including the terminals of all lines at Hampton Roads. With the exception of the Allegheny and the Pocahontas regions, the Eastern region will remain as originally defined, with A. H. Smith as Regional Director, and district directors under Regional Director Smith will be appointed for New England and for that portion of the Eastern region west of Pittsburgh and the Ohio river and south of the Erie main line. The selection of the Regional Directors for the Pocahontas region and for the Southern region, succeeding Mr. Markham, as well as of the two new district directors under Regional Director Smith, will be announced later.

"The same policy will be applied from time to time, as rapidly as may be convenient, in other parts of the country, always with the greatest possible regard for all the interests affected and with a view to preserving intact, as far as reasonably practicable, the operating organizations of the companies."

Railroad President Displaced

The announcement followed the making public of the fact that C. W. Huntington, president of the Virginian Railway, was retired as the chief operating officer of the company and that Joseph H. Young, president of the Norfolk Southern, was appointed federal manager of the road in charge of its operations by telegraphic orders from Mr. McAdoo on Monday, effective at 12:01 a. m. on Tuesday. The Railroad Administration had ordered some improvements on the Virginian Railway in accordance with its policy of developing the coal carrying roads to handle a greater tonnage of coal to the Hampton Roads district and it is stated that Mr. Huntington did not act with sufficient

promptness in carrying out the orders but delayed work pending a discussion of such matters as the amount of interest to be paid on the necessary capital.

Mr. Huntington has issued the following statement:

"President Huntington, when seen at the office of the Virginian Railway Company, said that he had been 'retired as the chief operating officer' of the Virginian Railway Company by a telegram sent from Washington at 9.55 p. m. Saturday, May 18, and received by his secretary Sunday morning, which read as follows:

C. W. Huntington, president, Virginian R. R. Co., 60 Wall street, New York.

It is hereby ordered, effective at 12.01 A. M., Tuesday, May 21, 1918, that C. W. Huntington, president of the Virginian Railway Company, be retired as the chief operating officer of the railroad of that company, and that thereafter his compensation be paid by the corporation so long as the corporation desires to utilize his services, and that Joseph H. Young be and he is hereby appointed federal manager of the Virginian Railway and placed in charge of operations thereof, with office at the Norfolk Terminal Station building, Norfolk, Va., with full power to do and perform any and all acts which may be necessary or appropriate in the efficient operation of said railroad, and in the making of all improvements and betterments which may be necessary or appropriate to enable said railroad adequately to serve the public needs.

All officials, agents, and employees of said road are required to obey orders issued by or under the authority of said federal manager.

W. G. McADOO.
Director General of Railroads.

"Mr. Huntington said that no reason had been assigned for the action of the director general and that he had no information on the subject except a news report that his retirement as chief operating officer of the Virginian Railway was because of his failure to obey an order of the Director General to make certain improvements on the railway. He added that the statement about failure to make ordered improvements was false, as no such order had ever been issued."

Published statements as to amount of the salaries to be paid to federal managers and members of the staff of the Railroad Administration are not confirmed, but no effort is made at the Washington office to deny the impression that officers' salaries to be paid by government will be limited to less than amounts paid under private management. The regional directors are expected to come to Washington shortly to discuss the appointments of the federal managers.

Eastern Liberty Loan Details

F. D. UNDERWOOD, chairman of the Third Liberty Loan committee, Eastern Railroads, has issued a statement giving complete details of the subscriptions by 691,521, employees of the Eastern Railroads for $45,829,500 Third Liberty bonds.

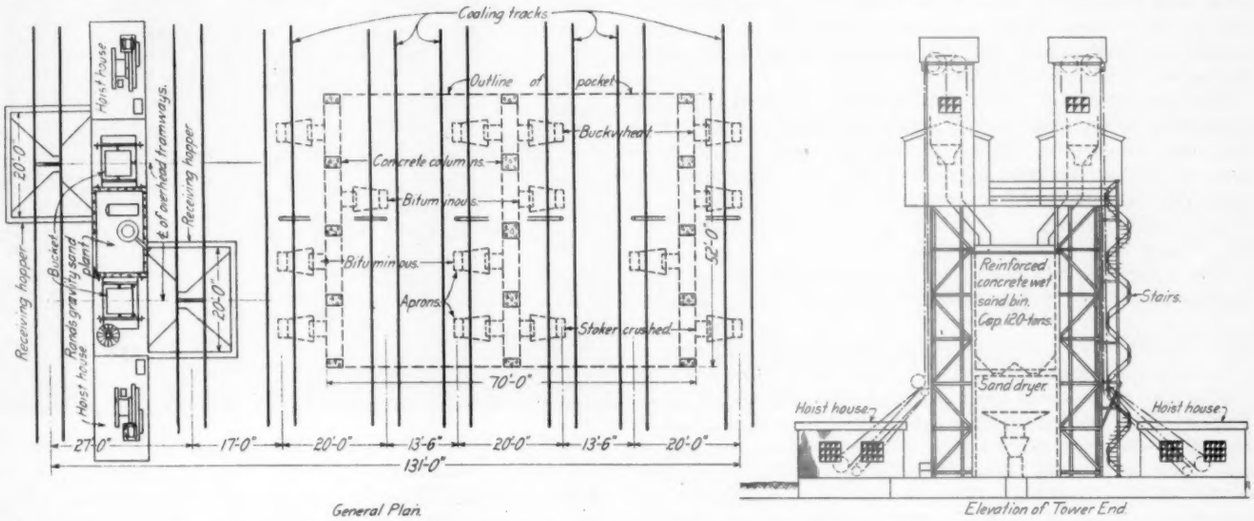
The total number of men employed by the 95 railroads and subsidiaries in the Eastern district is 876,886, showing that 78.9 per cent of the employees subscribed to the loan.

	First Loan		Second Loan		Third Loan			
Railroads	Subscribers	Subscriptions	Subscribers	Subscriptions	Total employees	Subscribers	Per cent	Subscriptions
Ann Arbor	.....	.....	.....	.....	1,468	1,267	86.0	$59,450
Baltimore & Ohio	4,940	$397,300	6,496	$501,800	65,679	56,273	85.5	4,013,350
Bangor & Aroostook	455	40,550	.....	15,600	1,692	829	48.0	61,850
Bessemer & Lake Erie	.....	.....	.....	.....	4,786	1,761	36.5	125,500
Boston & Maine	6,222	322,250	3,464	320,000	29,169	22,510	77.2	1,610,350
Buffalo & Susquehanna	99	49,150	199	38,550	1,027	512	49.8	53,900
Buffalo, Rochester & Pittsburgh	3,390	275,650	1,738	128,250	6,487	5,545	85.5	355,250
Central of New England	.....	.....	.....	.....	Included in N. Y., N. H. & H. figures.			
Central R. R. of New Jersey	1,050	87,900	2,180	138,050	14,211	11,181	78.0	759,150
Central Vermont	725	45,050	.....	.....	2,615	1,727	66.0	117,350
Chesapeake & Ohio	3,500	350,000	3,525	293,000	22,840	10,950	48.0	714,250
Chicago, Indianapolis & Louisville	163	21,500	323	35,250	4,110	2,823	68.7	160,500
Chicago, Terre Haute & S. E.	.....	.....	105	15,050	1,583	1,303	82.3	131,800
Cincinnati, Indianapolis & Western	.....	.....	323	22,850	1,736	1,135	65.3	100,600
Coal & Coke	.....	9,300	.....	5,050	918	603	65.6	37,400
Dayton, Toledo & Chicago	.....	.....	.....	.....	119	55	46.1	4,300
Delaware & Hudson	7,367	510,200	18,250	1,141,750	14,315	12,712	88.8	791,950
Delaware, Lackawanna & Western	16,886	1,091,350	17,671	1,071,500	22,544	21,208	94.0	1,302,850
Detroit & Mackinac	.....	.....	.....	.....	Employees bought locally. No report.			
Detroit & Toledo Shore Line	.....	.....	.....	.....	445	274	61.0	19,600
Detroit, Toledo & Ironton	.....	.....	.....	.....	Employees bought locally. No report.			
Erie	14,103	1,005,850	15,610	1,097,000	46,926	38,774	82.6	2,355,350
Grand Rapids & Indiana	.....	.....	1,772	127,250	Included in Pennsylvania system totals.			
Grand Trunk	.....	.....	.....	.....	9,600	7,141	74.3	391,350
Hocking Valley	150	30,000	1,669	138,300	5,200	1,788	34.4	121,300
Hudson & Manhattan	.....	.....	.....	.....	1,825	1,514	83.0	118,500
Huntington & Broad Top	.....	.....	.....	.....	524	392	74.8	27,350
Lehigh & Hudson	.....	.....	254	27,300	745	745	100.0	90,500
Lehigh & New England	.....	.....	348	24,000	1,290	1,290	100.0	94,850
Lehigh Valley	9,768	701,050	9,915	625,650	23,000	22,821	99.2	1,545,100
Long Island	.....	.....	2,293	220,050	Included in Pennsylvania totals.			
Maine Central	108	27,750	62	4,250	7,226	3,563	49.0	237,350
Monongahela	.....	.....	.....	.....	746	646	86.7	40,300
New York Central System—								
Lines East	19,312	1,345,150	20,894	1,343,050	64,248	53,918	83.9	4,114,800
Lines West					34,045	29,199	85.7	2,037,950
Boston & Albany	860	66,300	471	32,200	8,800	6,051	68.7	374,550
Cincinnati Northern	137	14,800	72	5,600	881	565	64.1	55,100
C., C., C. & St. Louis	2,448	192,200	5,668	389,100	23,042	21,240	92.1	1,549,150
Indiana Harbor Belt	327	29,100	498	30,400	2,921	2,156	73.8	138,150
Kanawha & Michigan	86	10,550	287	21,500	Included in T. & O. C.			
Lake Erie & Western	706	51,300	775	53,300	3,415	3,096	90.6	226,550
Michigan Central	4,448	335,950	3,621	264,450	15,390	12,090	78.6	835,850
Pittsburgh & Lake Erie	435	28,600	.....	.....	11,013	8,937	81.1	599,650
Rutland	563	43,300	660	74,200	2,300	1,898	82.5	140,900
Toledo & Ohio Central	269	22,850	998	70,450	5,400	4,412	80.2	330,250
Total, New York Central System	29,591	$2,140,100	33,944	$2,284,250	171,555	143,562	83.6	$10,402,900
New York & Long Branch	.....	.....	.....	.....	581	160	27.0	12,200
New York, Chicago & St. Louis	1,525	115,500	1,678	117,350	7,500	5,253	70.1	345,550
New York, New Haven & Hartford	327	26,950	242	21,700	42,000	30,988	73.7	1,981,600
New York, Ontario & Western	207	21,250	1,548	120,000	4,624	2,330	50.4	159,200
Norfolk & Western	2,074	251,800	3,575	364,000	26,569	14,279	53.7	1,177,650
Pennsylvania	52,510	3,378,350	124,789	9,243,500	249,795	205,883	82.0	12,378,200
Pennsylvania, Lines West	6,220	597,200	.....	.....	Included in Pennsylvania totals.			
Pere Marquette	974	.....	1,735	115,900	9,348	5,982	64.0	363,350
Philadelphia & Reading	5,588	398,450	8,393	566,800	31,658	21,655	68.0	1,313,100
Pittsburgh & Shawmut	39	5,600	158	30,000	558	477	86.0	48,400
Pittsburgh & West Virginia	.....	.....	.....	.....	166	133	80.0	7,800
Pittsburgh, Shawmut & Northern	.....	.....	110	205,400	Employees bought locally. No report.			
Toledo, St. Louis & Western	.....	.....	191	115,550	3,050	1,350	44.2	100,000
Ulster & Delaware	146	12,100	205	16,800	608	344	56.6	28,350
Virginian	128	8,300	.....	.....	4,439	1,977	44.5	220,650
Wabash	670	67,200	205	26,450	16,822	15,025	89.3	985,050
Western Maryland	1,108	69,500	315	22,750	6,835	5,262	76.1	335,850
Wheeling & Lake Erie	.....	20,000	411	28,450	4,351	3,666	84.0	243,400

An Example of Modern Coaling Station Construction

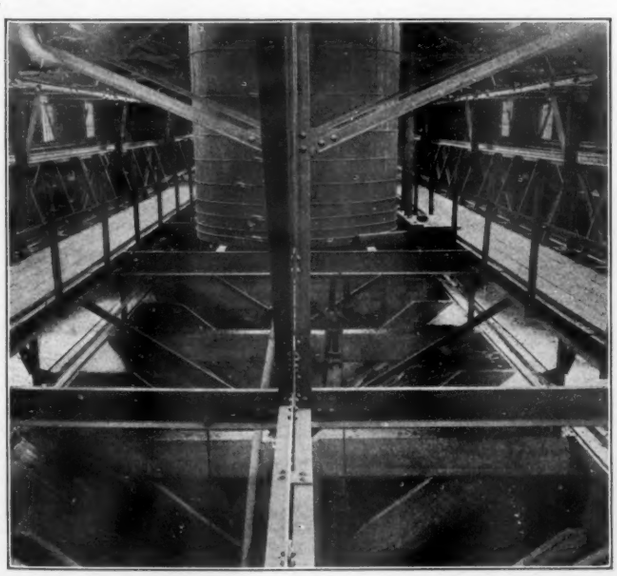
The Lehigh Valley Has Completed a Large New Plant Which Embodies Some Original Features

A NEW REINFORCED concrete coaling station has recently been completed on the Lehigh Valley at Manchester, N. Y., which is notable not only because of the volume of storage space and capacity of the structure while one passes along each end. The elevating towers are separated from the bin structure by a distance of 39 ft., the coal being transferred from the tower to the bin by means of two bridges spanning the intervening distance



Ground Plan Showing Track Arrangement and an Elevation of the Towers

receiving and discharge facilities, but also because of a number of innovations incorporated in its construction. Duplicate receiving and hoisting facilities, an arrangement

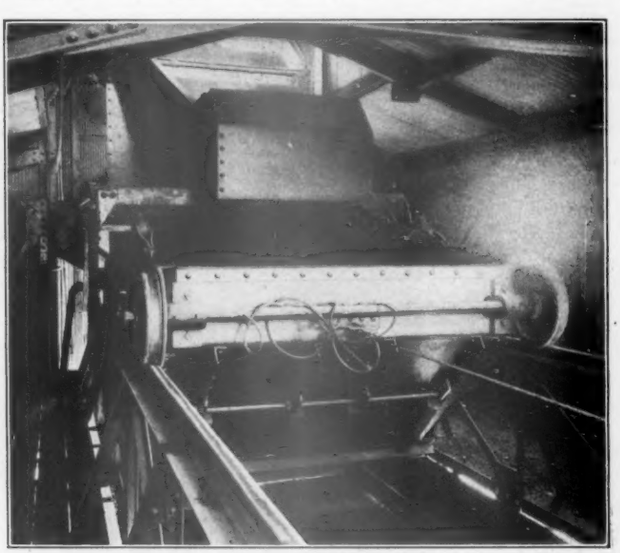


Arrangement of Chutes Over the Coal Pockets

for mixing the various kinds of coal as received, and an unusual compactness and convenience in the installation are among the special features that deserve notice.

The reinforced concrete storage bin is 70 ft. by 52 ft., and is elevated on concrete columns so as to serve locomotives standing on six tracks, four of which pass under the and forming a part of the superstructure covering the top of the bin.

This coaling station was designed and built by Roberts & Schaefer Company, Chicago, Ill., and the coal handling equipment is similar to that furnished in other plants built by that company, except as it has been modified to suit the particular requirements at this point. The elevating equip-



One of the Coal Trams Receiving Coal

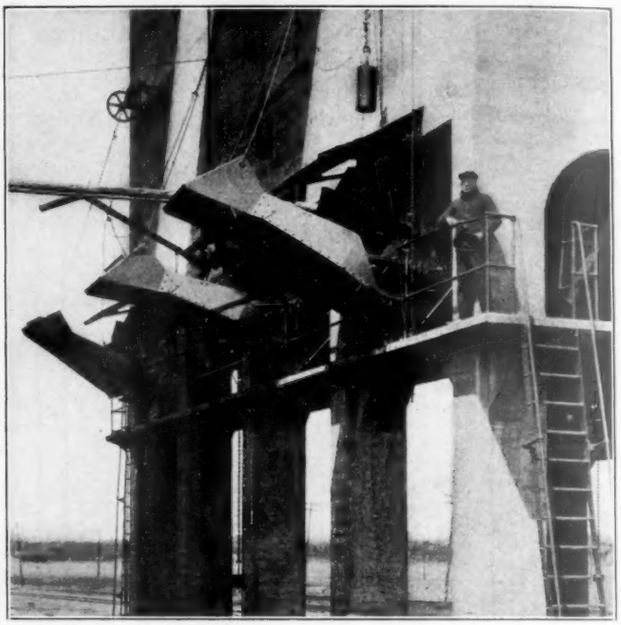
ment is in duplicate. Each elevating tower receives coal from a separate track hopper 20 ft. long from which it is fed automatically into the elevating bucket by means of a

Schraeder measuring coal feeder of 2½ tons capacity, this feeder being actuated by the ascent and descent of the elevating bucket. The bucket in turn is raised and lowered by an independent electric hoist, having a capacity of 75 tons per hour. Since there are two elevators, 150 tons of coal can be received from cars and distributed in the bins each hour. One of the prime advantages of this duplicate equipment is that the plant may be served by either of the hoists alone in case the other is out of service.

At the top of each tower the elevating bucket dumps coal into a "RandS" horizontal tram car, which is shown in one of the photographs, the tram car for each elevator traveling back and forth on its own track across the bridge and over the top of the bin. Each tram car is timed to make its excursion over the coal pocket horizontally, as the bucket makes its excursion vertically.

The operation of both the hoisting and distributing equipment is automatic, being under the control of a Cutler-Hammer automatic controller, so that the operation is continuous without the attention of the operator. However, the operation may be stopped or started at will by means of electric push buttons at two locations, one in the hoist on the ground level and one over the bin.

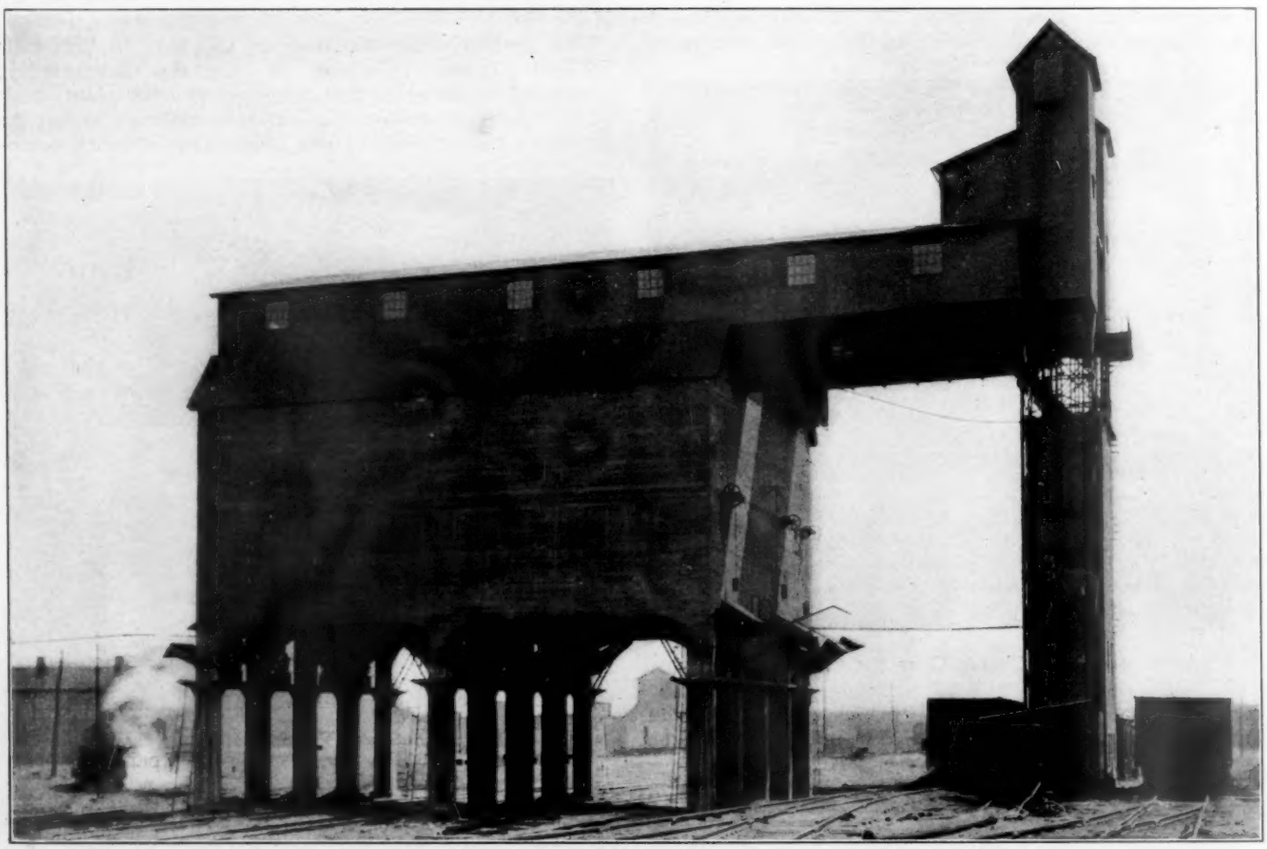
The 1,200-ton bin is divided into a number of pockets, equipped at the top with chutes for receiving coal at various points in the travel of the tram cars across the top of the bin. It will be seen from one of the photographs showing a view over the top of the bin that the two interior rows of pockets can receive coal from either or both of the tram cars. This arrangement has been made useful in a unique way. At the present time this plant is delivering to engines either buckwheat or run of mine, bituminous coal or a mixture of 30 per cent buckwheat with 70 per cent crushed stoker coal; or a mixture of 50 per cent of buckwheat with 50 per cent of lump run of mine bituminous coal. One kind of coal in any proportion can be elevated in one elevating bucket, and another kind of coal in any proportion can be elevated in the other elevating bucket, discharging into the two tram cars at the same time and through the concrete



The Pockets Are Equipped with Measuring Coal Loaders

chutes so as to bring this coal together at the delivery point into the storage pocket. Thus the coal in the pockets may be mixed in any desired proportions.

The coal bin is equipped with 14 electrically operated



The Station Will Coal Six Locomotives at One Time

"RandS" measuring coal loaders, for issuing and recording the amount of coal placed on locomotives at the rate of five tons per minute. The bin is arranged with steel walkways and pipe hand railings under the structure, and an operator is kept continuously on these walkways to issue all coal to locomotives, the loaders being operated by two horsepower electric motors with hand control.

In addition to the handling of coal, this plant is equipped with a reinforced concrete "RandS" gravity sand plant located between the bucket towers. The green sand is dumped in the track hoppers in the same manner as the coal, elevated in the elevating buckets, and discharged into a 120-ton capacity concrete wet sand pocket. Located directly under this are two Beamer steam sand dryers, which receive the sand through a rack and pinion gate. All of the dry sand passing through the dryers, which run continuously night and day without the attention of the operator, falls on a large steel hopper, over which the dry sand is screened, while the pebbles and foreign matter pass to the outside of the structure. The dry sand passing through the screen falls into an automatic Tyrone sand drum, and by the use of two air valves, the dry sand is blown by compressed air to the 20-ton capacity dry sand tank located over the bin. The bin is equipped with six moisture proof undercut sand valves and telescoping spouts for supplying sand by gravity to locomotives on the six tracks. By the use of the "RandS" gravity sand plant, the sand is not touched with hand or shovel from the time it is dumped in the track hopper until it is placed in the domes of the locomotives.

The force required to tend this plant during operation includes one operator in charge of the mechanical equipment for elevating and distributing, one operator to coal the locomotives by the use of the measuring loaders and three laborers who dump the coal over the track hoppers. The installation of the plant has been under the direction of E. B. Ashby, formerly chief engineer, now consulting engineer of the Lehigh Valley, and G. T. Hand, now chief engineer. All work in connection with this structure was executed by the forces of Roberts & Schaefer Company.

Train-Lot Plan of Moving Freight in West

Regional Director Achieves Marked Operating Economies by New Method of Handling Traffic

On February 25 there were approximately 12,000,000 bu. of grain in the primary markets west of Chicago waiting for movement to seaboard for export. Despite the urgent need for foodstuffs abroad, the acute operating difficulties of the railroads resulting from exceptionally severe weather had slowed up transportation so considerably that export grain was reaching the Atlantic ports irregularly and often too late for transfer to the vessels in which shipping space was reserved. Likewise, some ports became congested with this freight because of the absence of a well-worked out plan for the distribution of export traffic among the various coast terminals.

This condition demanded a prompt and effective remedy. Accordingly, R. H. Aishton, regional director of western railroads, and M. J. Gormley, his operating assistant, put into practice the train-lot system of handling freight. That the scheme is a success is evident from the record for the first two-and-one-half months' experience. Between March 1 and May 15, 7,348 cars of foodstuffs were handled in train-lot movements, most of which contained grain and flour for export. Under the new plan a continuous stream of export freight is moving uninterruptedly from interior markets to Atlantic and Gulf ports where bottoms, arranged for in advance, are waiting.

To illustrate the speed with which this traffic is now being handled, a trainload of oats recently made the trip from St. Paul to Baltimore in seven days. This instance is not an exception but merely indicative of what can be done when the time consumed in crowded yards switching cars from one line to another is eliminated. It is not exaggeration to say that the time of moving cars from western markets to seaboard has been cut in half by the new arrangement. Cars leaving St. Paul, for example, did well under former conditions if they reached Baltimore in 12 or 14 days.

How Train-Lot Plan Is Operated

Under the train-lot plan the regional director of western railroads receives daily reports from the Food Administration and the British Ministry of Shipping through which he is advised of all purchases of grain, flour and other foodstuffs at various primary markets. The regional director in turn telegraphs a "train-movement notice" to his terminal chairmen at the market centers, which contains all necessary directions concerning the furnishing of cars, time of departure and routing. Copies of these notices are also forwarded to all parties interested in any way in the handling of this traffic from the loading point to the destination of the freight.

It is incumbent upon the terminal chairmen to secure cars for the freight to be moved and to assemble these into trains. As soon as a train has been despatched over the designated road the chairman is required to telegraph the first connecting line and the regional director giving notice of departure indicating therein the probable time of arrival at the terminal or junction delivery point. The other lines involved in the movement likewise give telegraphic advice to their connections of the probable time of delivery, thus keeping all concerned fully informed and insuring continuous movement with minimum terminal delay. The road making final delivery at destination also advises the regional director's office by wire of the time of arrival. The following forms are used in telegraphing advice of the progress and arrival of a train-lot movement.

PROGRESS REPORT

To Connecting Line and to Regional Director:

Train movement Notice No. ....., Train No. ....., left ..... at (time) ..... (date) ..... with ..... cars of ..... (weight) ..... gross tons. Will arrive ..... (delivery point), at (time) .....

ARRIVAL REPORT

To Regional Director:

T. M. N. No. ....., Train No. ....., arrived at ..... at ..... (time) ..... (date) ..... with ..... cars of .....

The train movement notices are exceedingly simple, thereby facilitating prompt action on their receipt. Train Movement Notice No. 18, which is reproduced in part below, is typical:

MARCH 13, 1918.

The following movement of 500,000 bu. of wheat for export is ordered from Kansas City to New Orleans, via routes and on dates named. These

trains are to be handled intact and given continuous movement. All cars in any one train to be destined to one port:

Train No.	Date	Initial line	From	To	Routing
1	March 14	Mo. Pac.	Kansas City	New Orleans	Mo. Pac. (through) destination.
2	March 15	K. C. S.	Kansas City	New Orleans	K. C. S.-Shreveport-T. & P.-destination.
3	March 16	St. L.-S. F.	Kansas City	New Orleans	St. L.-S. F.-Memphis-Ill. Cent.-destination.

O. C. Hill, chairman, car service committee, will arrange details with D. F. Piazzek, zone agent, United States Food Administrator, and car pooling necessary. Kansas City lines are to make delivery of empty equipment as directed by Mr. Hill for this movement, and this to be done regardless of their other necessities.

Oil Movements Accelerated 100 Per Cent

The train-lot plan proved so successful in connection with the movement of export grain and flour that its application has been rapidly extended to other commodities. The second commodity to be handled according to the train-lot plan was oil in the so-called "mid-continental" field. This was necessitated by a reduction in the number of tank steamers available for oil movements from southern ports to the Atlantic seaboard, the increased demands for oil for governmental and industrial use and the impossibility of making any immediate additions to the available tank car equipment.

Following a conference of the Fuel Administration, the Railroad Administration and the oil industry, arrangements were made for the handling of oil traffic in train-lots. In order to facilitate the execution of the plan, the Oil section of the Fuel Administration appointed H. M. Conley, the oil interests appointed W. E. MacEwen and the Railroad Administration designated B. L. Swearingen as members of a committee on oil traffic, with headquarters at Kansas City. The plan provides for the consolidation of oil traffic from various refineries in train-lots at specified concentration points. When a train is made up the originating line designates it by a number and gives advance information to its connections of the point and time of delivery, together with the consist of the train. Similar information is passed on by each intermediate line, thereby insuring continuous and prompt service through to destination. The return movements of empty cars are effected by assembling cars at important terminals or concentration points and despatching them to points of origin as soon as trains are made up. Empty cars arriving at concentration or terminal points after one train has started are held for similar train-lot service on the following day, thus insuring a uniform and uninterrupted movement of empties and providing for an available supply of tank cars in refineries for loading.

In the first month of operation under the plan 6,562 cars were handled according to the train-lot method. The success of the scheme is indicated by the fact that the car mileage per day of oil equipment has been raised from 57 to 117 miles per day. A recent train consigned to one company in Pittsburgh made the trip from Tulsa, Okla., and return in 11 days. The new plan has not only insured an adequate supply of cars and eliminated delays in switching at terminals but has relieved the oil shippers of the necessity of employing a large corps of car tracers to locate delayed shipments. In fact, one of the most important advantages of the plan is that it dispenses with the services of those who demoralized yard forces through their efforts to secure special attention to the movement of oil shipments.

Plan Expedites Movement of Government Lumber

The application of the train-lot plan to the movement of government lumber from North Pacific coast points has been an unqualified success. Previously the government employed soldiers as train riders in order to secure the prompt and uninterrupted movement of shipments required for shipbuilding and aeroplane construction. Because of the unsatisfactory results under this plan, the regional director of western roads introduced train-lot service to take care of the traffic.

Under the practice inaugurated, shipments from various mills are consolidated at designated originating train movement terminals, from which trains are despatched as soon as 15 or more cars have been assembled. The regional director, the government, connecting lines and all others concerned are provided with telegraphic reports of the consist of the train, the time of departure, the probable time of delivery at junction points and passing times at division terminals. The plan enables the government and the regional directors to follow the train from point of origin to destination and, if so desired, to divert certain cars to different plants at designated diversion points. Inasmuch as reconsignment is limited to a few terminals it is possible in most instances for the terminal chairmen at those points to hold the diverted cars until they can be consolidated with other cars for the same destination, thereby making a new train-lot movement possible.

For example, at Billings, Mont., shipments originating over the Great Northern and Northern Pacific are consolidated into one train over the Chicago, Burlington & Quincy which takes a new train-lot identity and is handled in the same manner as previously, to destination. At Minnesota Transfer shipments arriving over the Northern Pacific or Great Northern are consolidated into one train and given to one specific line for movement beyond. Likewise, they are given a train identity, whereas formerly cars originating at that point were scattered over all the Twin City-Chicago roads. Operating economy is further effected by the provision in the plan permitting the filling out of lumber trains with other commodities to full freight tonnage rating. Experience under the train-lot plan of handling shipments shows a saving in time between coasts of from four to ten days.

The Plan as Applied to Packing House Products

Under the old system of operation all of the roads serving the packinghouse centers of South Omaha, Sioux City, South St. Paul and Kansas City sent switching crews to the packing houses daily to assemble cars routed over their lines. Each line likewise attempted to maintain schedules averaging from 28 to 30 hours between those points and Chicago. They were, however, rarely able to reach destination on time with the result that the cars generally required re-icing before arrival. The absence of any definite provision for re-icing under the old plan of operation resulted in considerable losses through the deterioration of meat.

Under the plan introduced by the regional director, the schedules have been lengthened and re-icing has been specifically provided for at the expiration of each 24 hours of the run. The plan further definitely assigns all shipments from each of these terminals to certain roads on certain days, thereby insuring sufficient tonnage for train-lot service by the handling line and eliminating the duplication of switching service with the unavoidable interference of one line with another in the yards of the packing plants. A marked advantage of the new practice is that each line knows definitely what traffic it will be called upon to handle and is in a position to perfect arrangements for its movement in advance.

California Perishable Traffic Pooled

The train-lot plan has also been applied to the California fruit and vegetable traffic. Under former conditions each line participated in this business and attempted to operate under schedules which they were rarely able to maintain. Under the new plan the traffic has been divided up among the different roads in a manner similar to that under which the meat traffic is handled and trains are moved only

when a minimum of 25 cars has been accumulated, whereas formerly the roads started trains containing as few as ten cars of perishable freight. In addition, the schedules have been lengthened to provide for arrival in Chicago in time for morning team track placements, including delivery to auction houses and to eastern connections. Under the old system the schedules also provided for morning delivery but trains frequently arrived late. Inasmuch as there was no advantage in delivery unless it could be made early in the morning, the Railroad Administration decided to add a day to the schedule in order to insure arrival at destination on time. Thirty hours, for instance, has been added to the schedule between Roseville, Cal., and Chicago, but this addition in time makes delivery in Chicago sure on the morning of the ninth day from point of shipment.

Another merit of the new practice is that each train has a specific routing from the loading point to destination. Under the former plan of operation a separate routing would be specified for each car with the result that trains would be divided among connecting lines at junction points. At Omaha, for instance, a receiving road might or might not, secure sufficient cars to make up a fruit train for Chicago. It is obvious, therefore, that the old method of handling perishable traffic was not conducive to economy.

Summary of Merits of Train-Lot Plan

The train-lot plan which has proved so successful in the movement of the commodities mentioned, is being rapidly extended to govern the transportation of other supplies including wool, sugar and hemp which have been moved in solid trains from the Pacific coast to the Atlantic seaboard.

The merits of the train-lot scheme may be summarized as follows:

(1) Through the pooling of equipment by all lines at loading points an adequate supply of cars is insured.

(2) Continuous movement of traffic is effected through the advance information furnished connecting lines concerning each train.

(3) Economy of operation is made possible by the elimination of switching at terminals.

(4) Fast schedules are not essential under the new plan, because continuous movement and minimum terminal delays enable trains to reach destination on time.

(5) The designation of certain roads to handle specific commodities on certain days insures maximum tonnage to the handling lines in contrast with the former method of dividing traffic and running several trains on different lines operating under the same schedules.

Doings of the United States Railroad Administration

Railroads Will Carry Own Insurance—Merger of Express Companies—Wage Increases Not Satisfactory

THE railroads of the United States now having been unified into a single system, the combined system is considered big enough to carry its own insurance, thereby saving that part of the amount of the insurance premiums which goes to make up the profits of the insurance companies.

On April 30 a telegram was sent to carriers, instructing them not to renew any expiring fire insurance policies on property in federal control, and not to take out any new fire insurance policies upon such property. It was provided that carriers might call attention to cases calling for exceptional treatment. A letter was sent to the carriers confirming this telegram, and the letter suggested care for fire prevention in terms similar to the last paragraph of this order.

The Director General has now issued General Order No. 24, in which he says:

"It is desired to extend the instructions to other insurance than fire insurance, excepting only bonds or policies insuring fidelity of employees in handling funds.

"Carriers, therefore, are now instructed not to renew any expiring insurance of any character, covering property in federal control, or any liability in connection with the operation or use of any such property, or liability for property transported or stored by carriers under federal control, and not to take out any new policies, or place any additional or new risks under existing policies, of such insurance, except that this order shall not relate to bonds or policies insuring the fidelity of employees in handling funds. Such fidelity bonds or policies shall be continued, and proper provision made for any necessary changes, as heretofore. Carriers may present to the director general any special circumstances which they believe call for exceptional treatment."

If the termination of insurance in accordance with this order results, as to any particular property, in the discontinuance by the insurance company of inspection or other measures for prevention of loss, it will be desirable to adopt proper substitute therefor, and the carrier must make reasonable and proper temporary provision for such inspection or other preventive measures, reporting its action to the director general.

The idea, of course, is that, the railroads being under a single control, a loss on one road can be made up by the saving in premium payments on other roads.

Many railroads now carry their own insurance and have accumulated considerable funds for the purpose. One of the points in controversy in connection with the negotiations with the government on the compensation contract involves the question as to whether such funds, accumulated by charges to operating expenses, belong to the companies or whether they have been transferred to the government.

C. A. Prouty, director of the Division of Public Service and Accounting, is taking steps to bring about uniformity in accounting for additions and betterments. In circular No. 3 he says:

"From advices received, there appears to be a lack of uniformity among accounting officers of steam railroad carriers in accounting for expenditures for additions and betterments incurred in connection with property (excluding land and equipment) retired and replaced.

"Uniformity in accounting for expenditures for additions and betterments must be attained, and to that end accounting officers of steam railroad carriers are hereby instructed to take such steps as will result in accounting for these expenditures in accordance with the accounting rules of the Interstate Commerce Commission.

"The attention of all concerned is directed to the general instructions of the commission's classification of investment in road and equipment, and particularly Sections 7 and 12 thereof.

"A copy of all inquiries addressed to the Interstate Commerce Commission requesting an interpretation of the rules referred to, should be forwarded to A. H. Plant, chairman of the Accounting Committee."

Freight Control Committees

Two additional committees for the control of freight traffic have been organized as subsidiaries of the North Atlantic Ports Freight Traffic Committee, which reports to the regional director for the eastern district. The two committees are located at Baltimore and at Philadelphia and are to control the movement of domestic freight into those ports. The Philadelphia domestic division consists of R. R. Blydenburgh, chairman, W. D. Corfield and W. F. Richardson. The Baltimore domestic division consists of E. S. King, chairman, S. T. Stackpole and W. A. Shropshire.

Railroad Offices in New York

No operating office in New York City of a railroad which does not reach New York City will be allowed to be charged to operating expenses under government control. This is a decision reached by Director General McAdoo after the entire subject of the expenses of corporate and operating offices of the railroads in New York City has been under consideration for some time. The director general has decided that he will not allow to be charged to operating expenses any of the expenses incident to the corporate existence of the corporations, which means that New York financial and corporate offices, if maintained, will have to be charged to the compensation which railroads receive from the government; and that of the New York offices, only those actually used for the operation of railroads reaching New York may be charged to operating expenses.

Proposed Merger of Express Companies

The contract between the Railroad Administration and the proposed Federal Express Company, which provides for a merger of the principal express companies of the United States into one company on the basis of an exchange of capital stock for physical assets, and for a contract with the Railroad Administration for the carriage of express traffic, has been practically completed and is now before Director General McAdoo for his approval. The contract provides for a division of the earnings of express traffic on the basis of slightly over 50 per cent to the government, this figure having been reached by taking the average of the amounts paid by express companies to railroads during the last ten years. The proposed combination thus far does not include three express companies owned by railroads, the Great Northern Express, subsidiary of the Great Northern Railway, the Northern Express, subsidiary of the Northern Pacific, and the Western Express, subsidiary of the Denver & Rio Grande and Western Pacific. These companies did not wish to be included because the railroads take the position that their earnings from express should be included in the compensation to be guaranteed them by the government, while the government has taken the position that it will make a contract with but one express company. The railroad-owned express companies, therefore, have been told that the government will not make a contract with them individually, but that they will be given an opportunity to join the proposed combination of the express companies on such terms as they can make, and the disposition of the matter is still unsettled.

Drop Letters Instead of Postcards

A. H. Smith, regional director for the eastern railroads, has sent a circular to the roads in his territory suggesting that drop letters at first-class postage rates be used instead of postal cards for communication with consignees regarding their freight shipments because under the new postal rates drop letters for delivery in the same community may be sent for two cents, the same price as a postal card, and they may be used to give more complete information. It is also understood that the drop letters sometimes receive better postal service than cards.

Consolidated Ticket Office in Chicago

Director General McAdoo has approved the selection of the ground floor of the Insurance Exchange building, located on Jackson Boulevard, with a frontage running from Sherman to Wells streets for the consolidated ticket office in Chicago. There will be two large rooms, the eastern half being occupied by the Eastern and Southern lines and the western half by the Western lines. There are at present 37 railroad ticket offices in Chicago which will be supplanted by the two consolidated offices. The annual saving in rental will be $198,725. The work of equipping the new offices will proceed as rapidly as possible.

It is estimated that the aggregate business transacted in the consolidated offices will exceed $16,000,000 a year.

Walker D. Hines

In Circular No. 26 the director general announces that Walker D. Hines, heretofore assistant to the director general, has been appointed assistant director general of railroads.

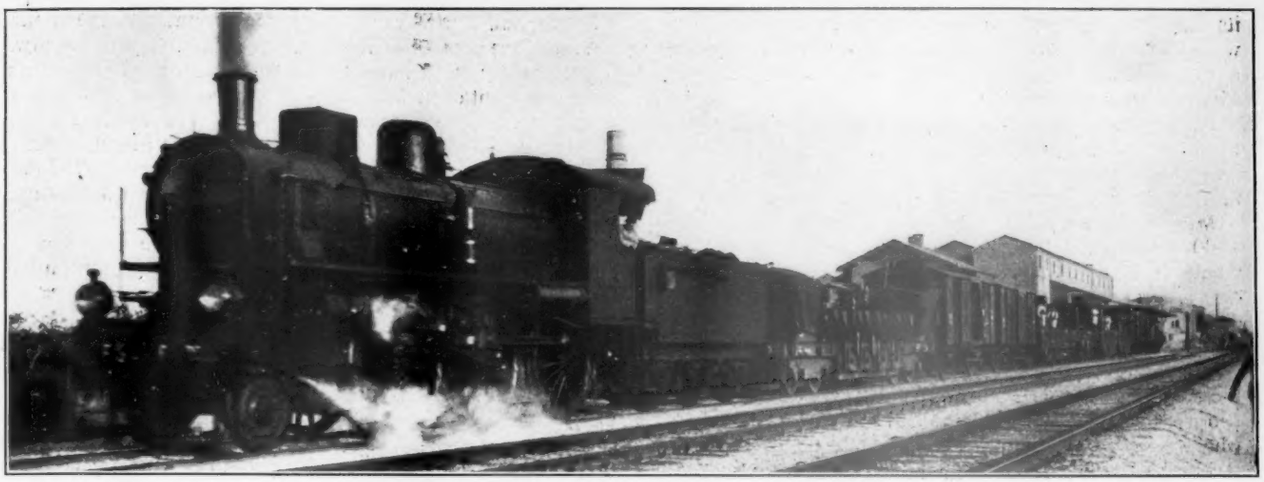
Compensation Contract

Negotiations between the representatives of the Railroad Administration and the committee representing the railways headed by Alfred P. Thom, regarding the form of contract for the compensation to be paid the railroads by the government are rather far from a conclusion and conferences are still being held. It is understood that the railroad committee and the government had approached an agreement when at the conference held on May 16 a committee representing the National Association of Owners of Railroad Securities, with Samuel Untermyer as counsel, appeared and interjected some new points of controversy into the discussions which may serve to prolong the negotiations.

Proposed Wage Increase Not Entirely Satisfatcory

It is becoming apparent that if the director general expects to keep railroad employees satisfied with their wages sufficiently to prevent them from leaving the railroad service for other employment it will become necessary for him to revise upward some of the recommendations of the Railroad Wage Commission, which would increase the railroad payroll by approximately $300,000,000 a year. Mr. McAdoo still has the report under advisement but meanwhile large numbers of railway employees are protesting that the recommended increases in wages as compared with those of December 31, 1915, will give them little or no increase at this time, because they have already received increases from the railroad companies which equal or in some cases even exceed the advances recommended, but which they do not consider sufficient. This condition applies with greater force on some roads than on others. The shop employees particularly have received increases by various settlements and arbitration proceedings of such an amount that the figures proposed by the commission would not benefit them greatly. The brotherhoods, although the increases in their earnings which resulted in many instances from the Adamson law are not counted against them, are also understood to have asked for more.

SINGLE-PHASE 1,200 H. P. FREIGHT LOCOMOTIVES.—On the Magdeburg-Halle-Leipzig railway, one of the busiest lines of Central Germany, three 1,200-h.p. locomotives were recently introduced for dealing with the freight traffic. Since then 27 new locomotives have been ordered. The engines are built by the Allgemeine Elektrizitäts-Gesellschaft and are worked by single-phase currents of 13,500 volts and 16⅔ periods per second. Each engine carries two motors; the speed is 50 km., about 30 miles, per hour. —*Engineering, London.*



An Italian Military Supply Train

Italian Railways Under Government Management

The Value of Unified Direction Exemplified as a War Measure During Three Years of War

By Our Special European Correspondent

(*Continued from page* 1119, *May 3.*)

THE railway history of Italy is not pleasant reading, certainly. There have never been the huge financial rewards for railroad builders as in a richer country, and as a general rule the government has been called upon to throw good money after bad in order to meet the national necessity of obtaining railroads. There has always been in Italy a good deal of railroad graft, ranging from the knocking down of fares to high finance, but for all that the building has gone along steadily, and the results are felt to have justified the expenditures.

Why Italy Took to Government Control

Government control because of military necessity hardly seems to have entered the minds of anybody in Italy during the long and heated controversies beginning in 1903 and ending in 1905 with the government taking over and running its railroads. In the light of present events, no stranger fact can be found in this connection than the failure of all the bright minds of Italy, in and out of the Senate and the Chamber of Deputies to see the inevitable necessity of taking over the railroads because of their military importance. In war time one might as well think of having the army and the navy run by a group of business men as of having the railroads run on the same basis as in peace times. I have read many of the public documents of those years regarding government ownership in Italy and hardly anywhere has this phase of railroad management been discussed.

The underlying reason was simply that socialism in those days was taking its first great stranglehold on Italy, including other countries of the world, and one of the truisms of socialistic doctrine is government ownership and the elimination as much as possible of private ownership or management of so-called public utilities and public service concerns.

A royal commission appointed by parliament to study the matter reported against government ownership, and the private railroad owners were against it, as were the majority of the commercial bodies of the country. The railroad employees and workmen in general and the political parties representing them were in favor and carried the measure.

The facts in the case were reviewed among others by Deputy Rubini before parliament June 30, 1904. Italy's railroads had always been controlled in some fashion by the government. Previous to 1885 it had let out certain lines and had then been under the necessity of taking them back or of putting up money to pay their losses; but in 1885 and thence until 1905 it had leased its lines to three large companies for a term of 20 years with the possible privilege of renewal for two other periods of 20 years each, the government guaranteeing interest to be paid on the company capital. For the two years preceding 1905 a popular campaign was begun to prevent the renewal of the leases for the second period of 20 years.

Having tried both systems of ownership Italy ought to furnish one of the best models of any country for studying both sides of the question. But from a money point of view there doesn't ever seem to have been much made out of the Italian roads. The private companies did show dividends of 4 to 6 per cent in the prosperous years of Europe around 1900, and those who remember their service claim it was much better than that which the state has ever been able to give since.

Those favoring state control, however, claimed the private companies had been able to show dividends because of the help given by the state. Deputy Rubini, who made the fairest, most exact and comprehensive review of the railroad situation that perhaps has ever been made here, stated that in the fiscal year 1904-5 the only correct interpretation of railroad accounts showed receipts to be 163,000,000 lire (one lira—19.3 cents) with expenditures 307,000,000 lire, with a virtual loss therefore of 144,000,000 lire. This loss he claimed had to come out of the pockets of the nation that had guaranteed the operation of the roads, so after all it didn't matter whether the roads were under private or state control; the loss existed and had to be paid even by those who stayed at home and benefited only indirectly by railroads. He pointed out that in 1885 the state had leased

its roads together with rolling stock and that after 20 years, with 9,000 kilometers of railway in operation representing a valuation of 5 billion lire, the state would owe July 1, 1905, about half a billion lire.

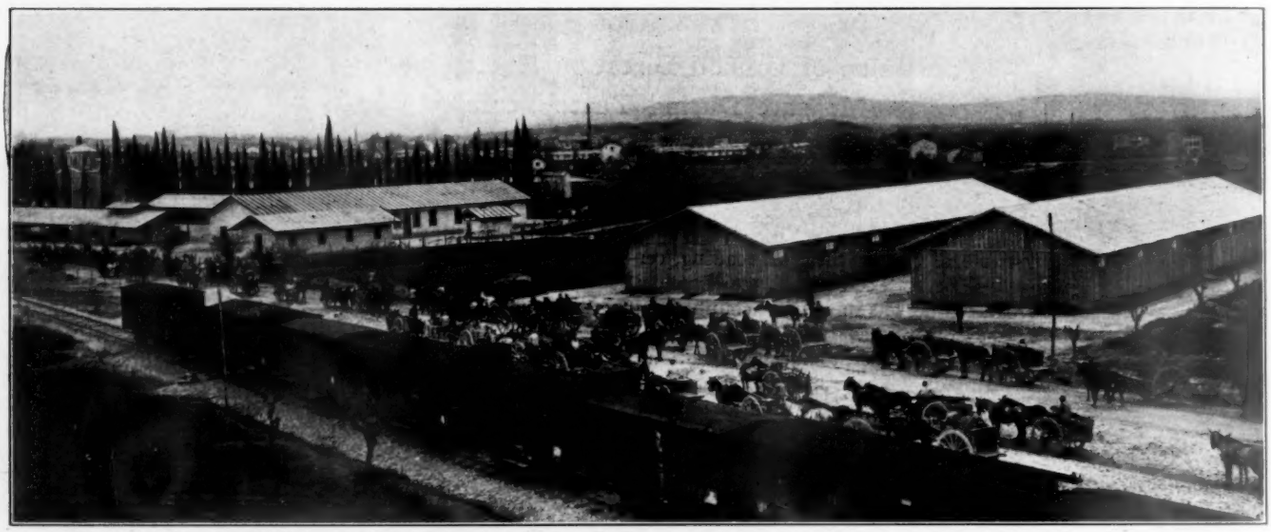
Rubini made careful comparisons of Italy's railroads with those of other European countries and gave some of the reasons why it was difficult to operate railroads in Italy and make them pay over a large territory.

Most of these reasons, I think, exist in 1918 as they did in 1900 or earlier. If one will take a map and look at the whole of Italy it will be seen that the country is traversed by the straggling chain of mountains the whole of which is called the Apennines. The only really level and rich country is that in the north, the city centers of which are Turin, Milan, Bologna and Venice. The next richest soil in fairly level country is that in central Italy, between the cities of Florence and Perugia, with a third bit of rich soil in the wheat country to the south of Foggia near the Adriatic straits.

The railroading problem in the north of Italy save for the grades reaching upward to the Alps and over the frontiers, has always been comparatively easy, with a level country and a rich agricultural soil and a large manufacturing population to draw from. But elsewhere, with a not very rich soil and with mountains to climb, mountains bare on their faces and with no stores of mineral wealth underneath, the problem has always been a staggering one. South of Bologna a central line runs to Florence, thence to Rome, and Naples, with two parallel lines following each coast of the peninsula. These three lines are not fed by many cross lines because of the mountains and also because of the lack of industial centers. The two seashore lines are in level but poor country.

Consider the line that runs down from Genoa to Pisa and thence to Rome. In 1905, in the short distance of 55 miles south from Genoa to the port of Spezia, there were no less than 81 tunnels, with the rest of the line to Rome going, after passing the port of Leghorn, through a dreary, swampy waste of land, with no profitable traffic except the little freight that could be picked up at the iron mines of the Isle of Elba. Even under the Romans, with thousands of slave workmen at their disposal, this region, kept open by the Aurelian road, constituted a problem. Only in the past dozen years, thanks to quinine and drainage, have its fevers been controlled and its land tilled.

There are about 50 miles of long tunnels in various sections of the railways, including 20, averaging 1½ miles in length, and expensive shorter tunnels counted by the hundred. Grades are another railroad curse to Italy. Trains are always going up or down mountains. The climb from Genoa to the French frontier at Modane, over a distance of 165 miles, is 3,120 feet. The central cities of Rome, Florence and Bologna are practically the same distance above the sea level, about 100 feet, but to get from Rome to Florence, a distance of 188 miles, there is a gradual climb of 600 feet over two-thirds of the distance. From Florence to Bologna, a distance of 80 miles, there is a midway climb of 1,800 feet. To cross Italy, in the south, from the flat wheat lands of Foggia to Naples, a distance of 118 miles, with Foggia 192 feet above sea level and Naples 36 feet, elevations of 1,652 feet must be overcome. To cross from the Adriatic Sea to Rome, on the opposite side of Italy, on the Castellamare-Adriatic-Rome branch of railway, a distance of 144 miles, beginning at an elevation of 15 feet and ending at one of 174 feet, a series of grades must be overcome the worst of which reached 2,700 feet above sea level. The prosperity of the country along this line is indicated by the statement that midway of the line is located the earthquake section where in 1915, near Avezzano, many thousands of people were killed or made homeless. One of the branches of this line, from Sulmona to Cainello, a distance of 104 miles, enjoys a grade of 3,345 feet, possibly the highest south of the Alps country.



An Italian Military Supply Station

These are a few samples of grades which indicate railroading conditions in Italy and might explain why, on the whole, the lines do not pay. Rubini pointed out that despite a large population (35,000,000), the ratio of travelers to 100 kilometers of line was but 396,560, as compared with 1,153,000 in France and as compared with 3,016,086 in Belgium.

Political Conception that Railroads Need Not Earn Money

But whether Italy's railroads had or had not earned money under private management, I believe they would have gone under government control just the same, given the political trend of thought in the country. We must remember that the Government of the United States was founded for the very purpose of obtaining relief from the petty vexations and restraints of Europe, this old Europe which for so many centuries has been nurtured on the idea that the government is all-powerful. When we in our happy slang say, "Let George do it," we express Europe from the ground up. Loving private initiative, born to individually and personally

do for ourselves, we cannot learn to lean on a government as they do here in Europe, and when I say Europe I mean continental Europe, for England, too, is one of the homes of personal endeavor. We have always had privately owned railroads for much the same generic reason that Europe has had the other kind.

It must be remembered that here in Italy is the 2,000-year-old example of a centralized government. The great

Italy Has Hundreds of Such Tunnels

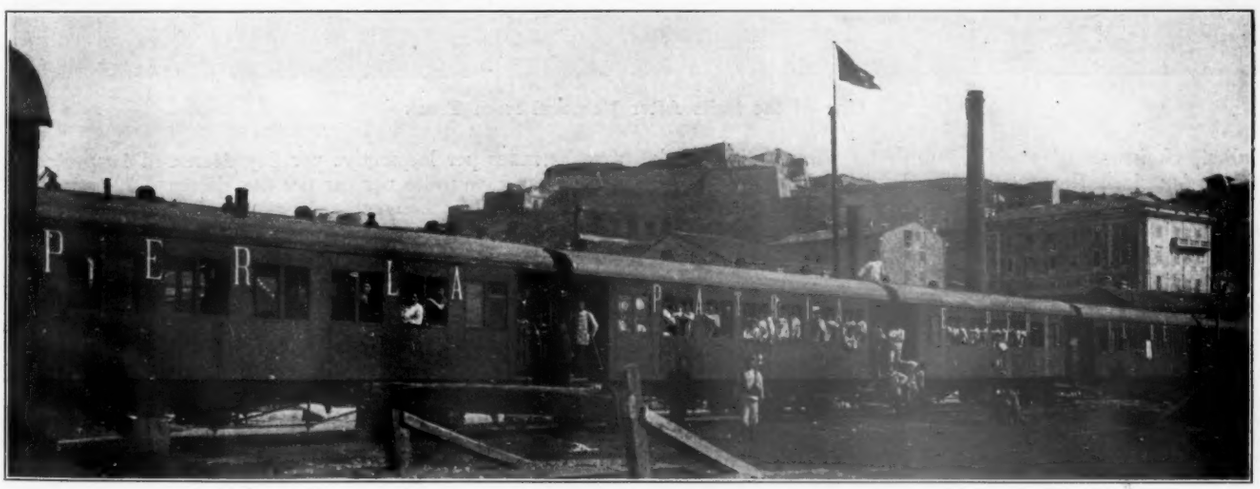
United States is but a child among nations, as compared to the thousand years of greatness enjoyed by the Romans. This old example of central authority is ever before these people, influences them today, and always will influence them. It is the secret dream of modern Italy, to establish once more a great world-encompassing government. Then, too, there is the more recent example of Napoleon who for a brief 15 years or so established a centralized government with a machinery more perfect, if possible, than that of the Romans. It is commonly stated that thanks to his system France has been held together ever since. There, authority more than law is the dominant force. Italy is modeled on the French lines, with the Napoleonic code as the basis of its government. The men governing Italy some 15 years ago had, too, been educated in the centralization organization of Germany. Many of them had attended German universities as students; and right here in Italy, too, there were a large number of German traders, bankers, salesmen, all of whom brought their educational ideas, the basis of which is that the state should control every large-scale activity.

For instance, Germany, like Italy, has not been given by nature a rich soil like that of France or of Russia, but by government organization and help she has increased her agricultural wealth until she imported, in the years just before the war, but 5 per cent of her foodstuffs to feed her population. "Let us do the same with Italy," argued Luzzatti, one of Italy's statesmen who helped pull up her finances. "Let us have rich farming districts and then our railroads will have more freight to carry. Why should Italy's railroads have to depend on passenger traffic for one-third to one-half of their revenues? But in order to enrich our farming districts we must build better railroads. Private companies cannot afford to spend the money to reach out into districts where at present there is no freight. Therefore the government must do this."

So gradually the view regarding railroads in Italy has come to be that they should not be expected to make money, primarily. If some time in the distant future they do earn money, it will be only as incidental to national prosperity.

The same arguments that have been only very recently brought up in the United States are very old in Italy, namely, that by state ownership the evils of private competition are eliminated, as in the case of running empty trains to the same points by different lines, the making of unfair tariffs to obtain long distance hauls; also, the employment of personnel for life instead of for a few months or years and thereby running the risk of losing efficient men and of at the same time injuring individuals by too frequent discharges; further, the danger of harming one section of a country by building up another section through unequal transportation favors. Government ownership, too, in a great measure has destroyed the speculation in railroad stocks, often to the injury of the public, since railroad shares are guaranteed by the government.

There are certain evils inherent in either private or public ownership, and in a future article I shall discuss these in relation to Italy's experiences so that American statesmanship may perhaps apply this experience to obtaining the best of both for ourselves.



For Country and King

PAPER CLOTHING FOR HUNGARIAN RAILWAY EMPLOYEES.—It is announced in the Bohemian press that experiments made with "paper cloth" have been so successful that the Hungarian State railways are to furnish their employees with summer clothing of this fabric.—*Commerce Reports.*

An Example of Kinked Rails

AN INTERESTING INSTANCE of rails being damaged as a result of the incorrect counter-balancing of locomotives was observed on the St. Louis-San Francisco last year, shortly after the receipt of some new Santa Fe type engines from the builders. Shortly after the engines were placed in service it was discovered that the rails were being kinked down and in towards the center of the track and tests made to determine the conditions under which this damage occurred showed that the damage commenced when a speed of 50 miles per hour was reached and that it became marked when the speed rose slightly above this figure. In fact many of the rails damaged at the higher speeds had to be removed from the track.

Longitudinal View of the Kinks

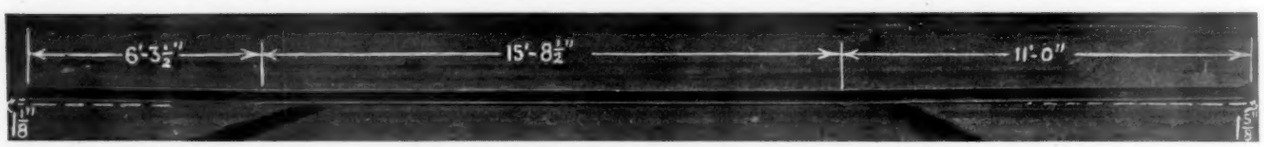
As shown in the photographs the damage consisted of an appreciable bend in the rail both horizontally and vertically. Sometimes the kinks were spaced at intervals equal to practically the exact circumference of the driving wheels, while in other cases they would be further apart. In one instance measurements extending over 10 rail lengths indicated that the kinks were 7 in. further apart than the circumference of the wheels. Sawing and calipering of the rails indicated that the rail section had not been distorted but that the entire rail was bent. There was no indication that the head had been bent on the web or that the web had been bent on the base.

This condition was called to the attention of Prof. A. N. Talbot, chairman of the Committee on Stresses in Track of the American Railway Engineering Association, and the Committee has undertaken to study this problem. While the committee is still working on it certain tentative conclusions have been drawn. It has been found that the stress in the rail under the main driver with the counterweight up was eight times as great as that which occurred when the counter weight was down, while under the other drivers the stress had its maximum value with the counterweight at its low point. These results were found at a relatively high speed for the type of locomotive used. Mean stresses in the base of the rail were found as high as 52,000 lb. per sq. in., which is equivalent to 57,000 lb. per sq. in. in the head of the rail for that particular rail section. In some of the test runs, both vertical and lateral kinks were created at points removed from the instrument and measurements from the kinks to the instruments indicated that the counterweight of the main driver was at the high point over the kinks. It is stated that the main drivers on the locomotives giving rise to the trouble were not counterbalanced by more than 900 lb., while the other drivers were over counterbalanced.

Report of Freight Operations for February

THE BUREAU OF RAILWAY ECONOMICS has issued the monthly report of freight operations of steam railways for the month of February, 1918, and the combined two months, January to February, iclusive, compiled for the American Railway Association. The returns, which cover roads operating 226,340 miles of operated line, are given in the accompanying table and, while they show some recovery from the conditions which prevailed in January, they represent comparatively little improvement as compared with February, 1917. The revenue ton miles increased 2.9 per cent for the month, tonnage per train increased 5.1 per cent, and the tonnage per loaded car increased 8.8 per cent. The average miles per locomotive per day decreased 10 per cent, and the average miles per car per day decreasd 7.9 per cent.

The results for the combined two months are considerably affected by the unusually difficult operating conditions experienced in January. For the two months the revenue ton



One of the Rails After Removal from Track

MONTHLY REPORT OF FREIGHT OPERATIONS OF STEAM RAILWAYS, FEBRUARY, 1918

Item	United States*				Eastern District			
			Increase or decrease				Increase or decrease	
	1918	1917	Amount	Per cent	1918	1917	Amount	Per cent
Freight train-miles	47,207,216	48,327,371	d 1,120,155	d 2.3	17,867,743	19,843,775	d 1,976,032	d 10.0
Loaded freight car-miles	1,028,372,774	1,089,322,702	d 60,949,928	d 5.6	403,715,034	471,480,374	d 67,765,340	d 14.4
Empty freight car-miles	421,493,003	433,143,150	d 11,650,147	d 2.7	186,564,156	203,099,615	d 16,535,459	d 8.1
Total freight car-miles—loaded and empty	1,449,865,777	1,522,465,852	d 72,600,075	d 4.8	590,279,190	674,579,989	d 84,300,799	d 12.5
Freight locomotive-miles	55,250,998	60,233,631	d 4,982,633	d 8.3	22,343,542	24,299,529	d 1,955,987	d 8.0
Revenue ton-miles	26,591,083,830	25,836,735,285	754,348,545	2.9	11,584,801,489	12,189,187,250	d 604,385,761	d5.0
Non-revenue ton-miles	2,626,467,989	2,549,615,620	76,852,369	3.0	832,850,097	783,612,154	49,237,943	6.3
Average number of freight locomotives in service	30,737	30,181	556	1.8	13,210	12,843	367	2.9
Average number of freight locomotives in shop or awaiting shop	4,743	4,574	169	3.7	2,191	1,975	216	10.9
Average number of freight cars in service	2,355,206	2,278,155	77,051	3.4	1,224,843	1,203,939	20,904	1.7
Average number of freight cars in shop or awaiting shop	122,368	125,226	d 2,858	d 2.3	71,301	69,997	1,304	1.9
Home	81,119	94,426	d 13,307	d 14.1	46,122	52,411	d 6,289	d 12.0
Foreign	41,249	30,800	10,449	33.9	25,179	17,586	7,593	43.2
Tons per train	619	587	32	5.1	695	654	41	6.3
Tons per loaded car	28.4	26.1	2.3	8.8	30.8	27.5	3.3	12.0
Average miles per locomotive per day	64.2	71.3	d 7.1	d 10.0	60.4	67.6	d 7.2	d 10.7
Average miles per car per day	22.0	23.9	d 1.9	d 7.9	17.2	20.0	d 2.8	d 14.0
Per cent of empty car-miles	29.1	28.5	0.6	2.2	31.6	30.1	1.5	5.0
Per cent of freight locomotives in shop or awaiting shop	15.4	15.2	0.2	1.8	16.6	15.4	1.2	7.9
Per cent of freight cars in shop or awaiting shop	5.2	5.5	d 0.3	d 5.5	5.8	5.8	...	d 0.1
Revenue ton-miles:								
Per freight locomotive	865,116	856,060	9,056	1.1	876,972	949,092	d 72,120	d 7.6
Per freight car	11,290	11,341	d 51	d 0.4	9,458	10,124	d 666	d 6.6
Average miles operated—single track	224,763.27	224,729.41	33.86	a	58,384.98	58,679.97	d 294.99	d 0.5

miles show a decrease of 7.9 per cent, but the tonnage per train shows a decrease of .7 per cent, and the tonnage per loaded car increased 10.3 per cent. Both the average miles per locomotive per day and the average miles per car per day show large decreases. The table gives the figures in detail and by districts.

Item	Southern District 1918	1917	Increase or decrease Amount	Per cent	Western District 1918	1917	Increase or decrease Amount	Per cent
Freight train-miles	8,761,317	8,333,821	427,496	5.1	20,578,156	20,149,775	428,381	2.1
Loaded freight car-miles	185,138,739	183,772,594	1,366,145	0.7	439,519,001	434,069,734	5,449,267	1.3
Empty freight car-miles	84,630,536	76,668,150	7,962,386	10.4	150,298,311	153,375,385	d 3,077,074	d 2.0
Total freight car-miles—loaded and empty	269,769,275	260,440,744	9,328,531	3.6	589,817,312	587,445,119	2,372,193	0.4
Freight locomotive-miles	9,916,119	9,310,157	605,962	6.5	22,991,337	26,623,945	d 3,632,608	d 13.6
Revenue ton-miles	5,097,420,924	4,650,472,066	446,948,858	9.6	9,908,861,417	8,997,075,969	911,785,448	10.1
Non-revenue ton-miles	441,820,311	444,019,003	d 2,198,692	d 0.5	1,351,797,581	1,321,984,463	29,813,118	2.3
Average number of freight locomotives in service	4,922	4,812	110	2.3	12,605	12,526	79	0.6
Average number of freight locomotives in shop or awaiting shop	612	606	6	1.0	1,940	1,993	d 53	d 2.7
Average number of freight cars in service	345,317	283,997	61,320	21.6	785,046	790,219	d 5,173	d 0.7
Average number of freight cars in shop or awaiting shop	13,022	12,399	623	5.0	38,045	42,830	d 4,785	d 11.2
Home	8,641	9,600	d 959	d 10.0	26,356	32,415	d 6,059	d 18.7
Foreign	4,381	2,799	1,582	56.5	11,689	10,415	1,274	12.2
Tons per train	632	611	21	3.4	547	512	35	6.8
Tons per loaded car	29.9	27.7	2.2	7.9	25.6	23.8	1.8	7.6
Average miles per locomotive per day	72.0	69.1	2.9	4.2	65.1	75.9	d 10.8	d 14.2
Average miles per car per day	27.9	32.8	d 4.9	d 14.9	26.8	26.5	0.3	1.1
Per cent of empty car-miles	31.4	29.4	2.0	6.6	25.5	26.1	d 0.6	d 2.4
Per cent of freight locomotives in shop or awaiting shop	12.4	12.6	d 0.2	d 1.3	15.4	15.9	d 0.5	d 3.3
Per cent of freight cars in shop or awaiting shop	3.8	4.4	d 0.6	d 13.5	4.8	5.4	d 0.6	d 10.7
Revenue ton-miles:								
Per freight locomotive	1,035,640	966,432	69,208	7.2	786,106	718,272	67,834	9.4
Per freight car	14,762	16,375	d 1,613	d 9.9	12,622	11,386	1,236	11.1
Average miles operated—single track	37,333.17	37,109.35	223.82	0.6	129,045.12	128,940.09	105.03	0.1

COMBINED TWO MONTHS, JANUARY TO FEBRUARY, INCLUSIVE

Item	United States* 1918	1917	Increase or decrease Amount	Per cent	Eastern District 1918	1917	Increase or decrease Amount	Per cent
Freight train-miles	95,602,849	104,060,302	d 8,457,453	d 8.1	36,000,489	42,602,719	d 6,602,230	d 15.5
Loaded freight car-miles	1,969,985,405	2,348,968,003	d 378,982,598	d 16.1	760,026,758	1,018,909,737	d 258,882,979	d 25.4
Empty freight car-miles	825,200,252	971,792,600	d 146,592,348	d 15.1	360,302,447	458,061,420	d 97,758,973	d 21.3
Total freight car-miles—loaded and empty	2,795,185,657	3,320,760,603	d 525,574,946	d 15.8	1,120,329,205	1,476,971,157	d 356,641,952	d 24.1
Freight locomotive-miles	111,959,263	125,105,159	d 13,145,896	d 10.5	45,087,177	52,299,427	d 7,212,250	d 13.8
Revenue ton-miles	51,654,747,581	56,077,522,197	d 4,422,774,616	d 7.9	22,259,307,686	26,511,836,426	d 4,252,528,740	d 16.0
Non-revenue ton-miles	5,317,971,911	5,479,616,119	d 161,644,208	d 2.9	1,664,344,249	1,639,533,087	24,811,162	1.5
Average number of freight locomotives in service	30,834	30,476	358	1.2	13,113	12,871	242	1.9
Average number of freight locomotives in shop or awaiting shop	4,796	4,558	238	5.2	2,109	1,983	126	6.4
Average number of freight cars in service	2,363,861	2,287,117	76,744	3.4	1,225,455	1,206,324	19,131	1.6
Average number of freight cars in shop or awaiting shop	121,130	127,392	d 6,262	d 4.9	68,960	71,230	d 2,270	d 3.2
Home	82,586	96,419	d 13,833	d14.3	45,853	53,398	d 7,545	d 14.1
Foreign	38,544	30,973	7,571	24.4	23,107	17,832	5,275	29.6
Tons per train	596	592	4	0.7	665	661	4	0.6
Tons per loaded car	28.9	26.2	2.7	10.3	31.5	27.6	3.9	14.1
Average miles per locomotive per day	61.5	69.6	d 8.1	d 11.6	58.3	68.9	d 10.6	d 15.4
Average miles per car per day	20.0	24.6	d 4.6	d 18.7	15.5	20.8	d 5.3	d 25.5
Per cent of empty car-miles	29.5	29.3	0.2	0.7	32.2	31.0	1.2	3.7
Per cent of freight locomotives in shop or awaiting shop	15.6	15.0	0.6	4.0	16.1	15.4	0.7	4.3
Per cent of freight cars in shop or awaiting shop	5.1	5.6	d 0.5	d 8.9	5.6	5.9	d 0.3	d 4.7
Revenue ton-miles:								
Per freight locomotive	1,675,253	1,840,055	d 164,802	d 9.0	1,697,499	2,059,812	d 362,313	d 17.6
Per freight car	21,852	24,519	d 2,667	d 10.9	18,164	21,977	d 3,813	d 17.3
Average miles operated—single track	226,340.56	226,387.66	d 47.10	*a*	58,377.35	58,678.89	d 301.54	d 0.5

Item	Southern District 1918	1917	Increase or decrease Amount	Per cent	Western District 1918	1917	Increase or decrease Amount	Per cent
Freight train-miles	18,108,649	18,437,001	d 328,352	d 1.8	41,493,711	43,020,582	d 1,526,871	d 3.5
Loaded freight car-miles	356,137,932	408,321,128	d 52,183,196	d 12.8	853,820,715	921,737,138	d 67,916,423	d 7.4
Empty freight car-miles	171,054,422	176,764,102	d 5,709,680	d 3.2	293,843,383	336,967,078	d 43,123,695	d 12.8
Total freight car-miles—loaded and empty	527,192,354	585,085,230	d 57,892,876	d 9.9	1,147,664,098	1,258,704,216	d 111,040,118	d 8.8
Freight locomotive-miles	20,371,426	20,610,048	d 238,622	d 1.2	46,500,660	52,195,684	d 5,695,024	d 10.9
Revenue ton-miles	9,682,912,295	10,224,430,606	d 541,518,311	d 5.3	19,712,527,600	19,341,255,165	371,272,435	1.9
Non-revenue ton-miles	958,686,035	996,270,153	d 37,584,118	d 3.8	2,694,941,627	2,843,812,879	d 148,871,252	d 5.2
Average number of freight locomotives in service	5,191	5,122	69	1.3	12,530	12,483	47	0.4
Average number of freight locomotives in shop or awaiting shop	674	631	43	6.8	2,013	1,944	69	3.5
Average number of freight cars in service	355,107	296,494	58,613	19.8	783,299	784,299	d 1,000	d 0.1
Average number of freight cars in shop or awaiting shop	14,146	13,985	161	1.2	38,024	42,177	d 4,153	d 9.8
Home	9,698	11,008	d 1,310	d 11.9	27,035	32,013	d 4,978	d 15.5
Foreign	4,448	2,977	1,471	49.4	10,989	10,164	825	8.1
Tons per train	588	609	d 21	d 3.4	540	516	24	4.7
Tons per loaded car	29.9	27.5	2.4	8.7	26.2	24.1	2.1	8.7
Average miles per locomotive per day	66.5	68.2	d 1.7	d 2.5	62.9	70.9	d 8.0	d 11.3
Average miles per car per day	25.2	33.4	d 8.2	d 24.6	24.8	27.2	d 2.4	d 8.8
Per cent of empty car-miles	32.4	30.2	2.2	7.3	25.6	26.8	d 1.2	d 4.4
Per cent of freight locomotives in shop or awaiting shop	13.0	12.3	0.7	5.4	16.1	15.6	0.5	3.2
Per cent of freight cars in shop or awaiting shop	4.0	4.7	d 0.7	d 14.9	4.9	5.4	d 0.5	d 9.7
Revenue ton-miles:								
Per freight locomotive	1,865,327	1,996,179	d 130,852	d 6.6	1,573,226	1,549,408	23,818	1.5
Per freight car	27,268	34,484	d 7,216	d 20.9	25,166	24,661	505	2.0
Average miles operated—single track	39,158.62	38,975.98	182.64	0.5	128,804.59	128,732.79	71.80	0.1

* The returns included in the monthly statement represent about 97 per cent of the total operated mileage of the roads of Class I, and about 99 per cent of their total traffic.

d Decrease.

a Less than one-tenth of one per cent.

Compiled for the Association by Bureau of Railway Economics, Washington, D. C., May 16, 1918.

Railroad Men's Mountain Home Association

THE PROJECT FOR A Railroad Men's Mountain Home in Colorado, mentioned in the *Railway Age* of March 22, has aroused much interest among the railroad men, who are now lending their support to such an extent that a sufficient sum of money has already been guaranteed to enable the board of directors to start work on their plans to provide a recuperation camp for returning soldiers who enlisted from the ranks of the railroad and express service. It is believed that within the next 30 days two buildings will be ready for occupancy and will accommodate approximately 25 men. As funds are received through the generous assistance of various railroads the accommodations will be rapidly enlarged, and eventually the complete plan will be in successful operation, so that railroad men in need of such assistance, regardless of whether they have been actively engaged in military service, will be afforded the opportunity to regain health and strength under ideal conditions.

The plan has the approval of a number of important railroads. The Chicago & Alton, St. Louis Southwestern, Oregon Short Line, Denver & Rio Grande, Colorado & Southern and Oregon-Washington Railroad & Navigation Company, as well as several smaller lines, have brought the matter to the attention of their officers, agents and employees with request that contributions be sent to the treasurer of the company, who, in turn, will remit to the First National Bank, Denver, Colo., which is acting as treasurer for the Mountain Home Association. The Rock Island, Baltimore & Ohio, Southern Pacific, Oregon-Washington Railroad & Navigation Company, and several others have made appeals to their men through their employees' magazines with gratifying results.

Railroad men are also being solicited by letter. to send 25 cents or a thrift stamp or two to the bank in Denver for the support of the home, as the stamps can be very easily remitted. The Association of Transportation and Car Accounting Officers has officially endorsed the plan and is circularizing its officers and others, bringing to their attention the "Thrift Card" plan for raising funds. Employees of the Southern Pacific shops at San Jose, Cal., have collected and remitted to the treasurer of the association a total of $127.50 for the purpose of equipping a San Jose section in the home.

Apparently an erroneous impression prevails in some quarters, that the plan has been established in connection with the government plans for the rehabilitation of wounded and disabled soldiers. The association will not undertake any work of this kind, but its activities will be almost wholly confined to affording the opportunity for convalescent and weary railroad men to recuperate under ideal conditions. No attempt will be made to conduct a hospital or take care of surgical cases.

A circular letter addressed to railroad men explains the plan in part as follows:

"The *Railway Age* of January 4 says the American railroad fraternity was represented in the army on that date by about 70,000 men. You probably have, or will have, relatives and friends facing the bullets in France; and, in the natural course of events many of them will return disabled or afflicted. Therefore, it is essential that means be provided to care for them on their return.

"Seven railroad men and citizens of Denver have incorporated, under the non-profit sharing statute of Colorado, and have accepted 40 acres of mountain ranch, donated by a railroad man, 30 miles southwest of that place on the side of a mountain, ideally located, where accommodations will be provided so our railroad soldiers may find rest among the pine trees and pure mountain air.

"A fund is being provided for carrying out this undertaking, buying additional property if necessary, building cottages, making improvements, etc. Your assistance is requested. The board of trustees is giving its time toward the furtherance of this laudable enterprise. They will pass on the eligibility of applicants desiring to go to the home, and furnish all information regarding the plan, as it will be maintained at as low a cost as possible on the co-operative principle. No compensation of any kind is to be received by any one other than the actual employees. It is hoped to have a few cottages ready for early summer; and, by the end of the year, to increase the capacity to accommodate at least 1,000.

Location of the Railroad Man's Mountain Home

"If you are in sympathy with this movement kindly send 25 cents or more, or a government thrift stamp or two, to the cashier of the First National Bank, Denver, and write at least five copies of this letter to other railroad or express company men and women. The writer of this has the assurance of a friend from whom it was received that it is a very worthy cause. This assurance can be handed down the line to the railroad people of the United States, who can verify it by inquiring of any railroad man in Denver, as the newspapers have given it publicity."

TWO HUNDRED AND SIXTY-FIVE TRAINS OF HUN WOUNDED.—Two hundred and sixty-five trains full of wounded soldiers returning to Germany from the battle fronts of Picardy and Flanders, says the newspaper Les Nouvelles of The Hague, were counted in the daytime on April 9, April 11 and April 12, on the Namur-Liege Railway. The transports were so crowded that the Germans were even using open coal cars to carry the wounded.

Durability of Untreated Piling Above Mean Low Tide

Report of an Investigation of the Protection Afforded by Saturation Above the Water Level.

By C. H. Teasdale and Mabel E. Thorne
Forest Products Laboratory, Madison, Wis.

IT HAS LONG been recognized that wood constantly immersed in water is not subject to decay. Instances are on record of wood being preserved in this way for centuries. Timber structures in fresh water or in water free from the various forms of marine wood-borers remain sound indefinitely, unless affected by some destructive agent other than decay.

In tidal water, where marine borers are not active, portions of piles that are completely immersed at each high tide may be exposed at other times without danger of decay, for though completely immersed only part of the time, they may be practically saturated all the time. The extent of this saturation, and therefore permanent preservation against decay, is an item of considerable interest and importance in designing pile construction. The difficulties of cutting off piling at low water, as well as the extra cost and weight of the superstructure when joints are made at low tide level, may well be avoided wherever immunity from decay exists for any distance above this level.

Because there is so little available data as to the extent of this immunity zone, the Forest Products Laboratory has recently been conducting a study of the subject by the questionnaire method. Replies to the questionnaire are given in this report. They show careful thought, and several of them contain records of actual investigations made after the questionnaire was received.

Effect of Setting in Earth

A few of the replies make note of the fact that piles set in an earth wharf are free from decay to a greater distance above mean low tide than those set alone. For example, Edwin Lord, harbor master at Bangor, Me., writes that "where the wharfing and piling have been covered with earth and saturated at high water the timber remains sound. I have seen the wharfing uncovered and the logs apparently in perfect condition where they have lain for nearly 70 years."

Raymond F. Bennett, president, Bennett Contracting Corporation, Portland, Me., states that "for piles driven in a solid earth wharf, the height of no decay would be higher than for piles standing alone, and this height would also increase with the distance of the pile from the edge of the fill. A Boston engineer who designed a structure to be built on a solid fill wharf in this harbor, stipulated that the piles near the edge of the fill should be cut off 5 ft. above mean low tide; and that piles say, 20 ft. and further from the edge of the fill, should be cut off at 7 ft. I think probably this is good practice."

The United States Engineer Office, Galveston, Texas, writes as follows: "A pile and brush dike was built about 1902 on the north side of Galveston channel, the piles being green with the bark on and their tops being about 4½ ft. above mean low tide. This dike was partially covered by material excavated from the channel, but some of the material has since washed away, so that the piles which remain now stand on ground which is possibly one foot above mean low tide. In other words, they stand in water part of the time. Those of the piles which have not been touched by the teredo are still sound although the bark is gone." (Mean tide level is 0.3 ft. above mean low tide in Galveston harbor.)

The Commission on Waterways and Public Lands of Massachusetts reports: "A great deal of solid clay filling has been done in Boston, and piles driven into it have been found solid up to 13 ft. above low water 30 years after they were driven. Above that level they were practically all decayed, the filling above the clay being gravel." (Mean tide level here is 4.5 ft. above mean low tide.)

One particularly interesting case was reported from Galveston. Under the direction of the U. S. Engineer Office, an examination was made of piles set in a salt marsh or meadow, so enclosed that they were protected from teredo and yet were subject to frequent immersion in salt water. The nominal range of tide at Galveston is less than a foot but the harbor is subject to storms which force the water up onto the shores of the bay to much greater depths. The following is quoted from the letter describing the results observed:

"The piles in an old trestle built about 1892 across a salt marsh on the east end of Galveston island were examined. The piles are pine. In order to make an examination the dirt was removed from around them to a depth of about 18 in. The results of the examination are tabulated thus, all elevations being referred to mean low tide.

Pile	Diam. at top inches	Elev. of top of pile	Elev. of ground surface	Condition and remarks
No. 1	14	plus 4.8	plus 4.4	The full exposed part of the pile except the heart is decayed.
No. 2	12	plus 5.6	plus 4.1	Decayed, except heart.
No. 3	18	plus 4.9	plus 3.3	Sound.
No. 4	12	plus 4.0	plus 3.0	Sound.
No. 5	16	plus 4.8	plus 2.7	Sound.
No. 6	12	plus 4.9	plus 2.6	Sound.
No. 7	12	plus 4.7	minus 0.6	Sound. Contains a few small teredo holes, but no live teredo was found.

"Remarks: Piles 1 and 2 are on level ground covered with marsh grass. Pile 3 is located at the head of a small swale or depression leading to tidewater, and the remainder of the piles follow down this depression consecutively, as numbered. Piles 3 to 7 were saturated with water so that driving a hatchet into them brought water to the surface. The wood was bright and clean as if newly cut from the forest."

H. E. Manvel, vice-president, Rhodes & Manvel, Inc., states that: "We have also found that on foundation piles driven in salt meadow which is permanently wet to high water line, that capillary action saturates the piling for a distance of 12 to 18 in. above the high water mark, and it is very seldom that the piling will rot below that point, so we can broadly state from our experience that timber and piles will be saturated on an average from 1 to 2½ ft. above the permanent water level."

The extent above mean low tide to which these piles remain sound may be explained by the fact that salt has certain preservative properties.

Protection from Weather

Protection from the action of the weather is also an important factor in the durability of piles. The following replies mention this point:

T. A. Scott, harbor master, New London, Conn.: "Piles or timber extending above mean low water (New England coast), which are saturated every high water will stand preserved for at least 50 years and longer if that part of the timber exposed to the atmosphere all the time is under some protection from the weather."

S. R. Alexander, acting harbor engineer, Baltimore, Md.:

"I also noted that timbers buried in earth filling behind bulkheads were in much better condition than those exposed to the air even though the latter were in many cases lower than the former."

Richard A. Monks, vice-president, John Monks & Sons, New York, N. Y.: "As foundation piles are not exposed to any drying factors, such as sun-light, etc., they should retain their life indefinitely, if cut about half tide or below this level.

Commission on Waterways and Public Lands, Massachusetts: "Many piles have been observed in old wharves where the outer portion of the timber is sound up to about the high water mark, while the center portion has been decayed—the decay extending to half tide or below. Piles cut off just below mean high water and having their tops protected from rain water will undoubtedly last indefinitely, excepting for the action of worms and ice, and especially so when they are not exposed to the sun."

Relation of Durability to Mean Tide Level

Replies received from 25 different sources were summarized and divided into two classes, those which state that for permanent foundation work piles can be safely cut off at mean tide level or above and those which state that the zone of safety does not extend to mean tide level. It was noticeable that the grouping of these replies according to their character is a geographical grouping as well. The climate of the northern states is more favorable to the long life of piling than that of the southern states. From the data at hand, it would seem that the line of demarcation between the harbors in which it is safe to cut off piling at mean tide level or above and the harbors in which it is not safe lies somewhere between New York and Baltimore.

The rate at which a pile dries is largely dependent on temperature and relative humidity. The relative humidity varies only slightly from Maine to Florida, while the temperature variation is considerable. This means that, a few hours after high tide, piles in southern waters will have a much lower percentage of moisture than those in northern waters, which, combined with the encouragement to the growth of fungi furnished by the higher temperatures, probably accounts for the variation in the extent of the zone of safety.

Orders of Western Regional Director

DURING the past week R. H. Aishton, regional director of western railroads, has issued the following circulars:

Purchases

In supplement No. 1 to R. P. C. Circular No. 7, dated May 15, the western regional purchasing committee says:

The central advisory purchasing committee at Washington has now decided as follows: The proposed plan for turning over to the purchasing agents of producing lines for handling, inspecting and shipping from one road to another unfilled contracts or orders placed prior to government action on March 13, 1918, as outlined in R. P. C. Circulars 1 and 7, cannot be made effective in time to avoid delay in delivery for this season's requirements. Therefore the following will be observed:

1. All contracts or orders for cross-ties placed prior to government action March 13, 1918, must be handled on their merits. Roads having such contracts or orders unfilled should immediately take up with the contractors the questions of completing shipment if possible by June 15.

2. There may be old contracts made at low prices that should be revised. In such cases the committee will consider such recommendations as roads submit. In the event of any question as to adjustment of price, the matter should be taken up direct with the contractor and if an increase is warranted, the recommendation of the road interested should be submitted for approval to the regional purchasing committee with full explanation.

3. The receiving roads will continue to take up and inspect the ties same as heretofore. It is hoped that all such contracts or orders as are not completed by June 15, should be given special consideration at that time as to the best means of handling and completing them.

4. All embargoes on ties to be shipped from one road to another should be lifted and the ties moved as soon as possible.

5. The road on which ties are produced will give every assistance possible to secure prompt completion of such orders and contracts.

6. If there is any shortage of cars for moving ties, the matter should be brought to attention of regional director.

Track Labor—Season 1918

Supplement No. 3 to Circular No. 63 issued by the western regional director reads as follows: In order to avoid any misunderstanding, and the possibility of laborers transferring from one line to another, please discontinue at once the payment of time and a half for Sunday work to section and extra gang track laborers, regardless of whether the practice was in effect prior to the issuance of Circular No. 63 or not.

Cars for Grain Loading

In a communication to grain-carrying roads, dated May 17, the western regional director gives the following instructions:

Special efforts must be made, in anticipation of heavy grain movement, to have all available box cars fit for grain loading in proper repair. It must be realized that with the large percentage of foreign cars on the various roads this year special attention will have to be given to these cars that they may be made fit for this service. Specialize on repairs to box cars and pay particular attention to those repairs relating to the subject of this circular.

Engines Available

In Circular No. 105, dated May 16, the western regional director asks western lines to send him a report of all engines now tied up *awaiting service* giving information as called for below:

Engine Nos.	Where Located	Type of Loco.	Kind of fuel used	Tractive Power	Size Drivers	Size Cyls.	When will they be required for service	Remarks

He also asks for additional reports whenever the engines referred to are put in service or additional engines are tied up awaiting service. This refers to passenger engines of 25,000 tractive power or over and other engines of 33,000 tractive power or over.

Equipment—Wagon Coal Mines

Supplement No. 1 to Circular 51, issued by the western regional director on May 16, reads as follows: The object of restricting wagon coal mines to the use of box cars is to conserve the open-car supply for mines loading coal from tipples. In order that the situation may be taken care of as fairly as possible it is further provided:

1. When open-car equipment available is sufficient to provide full car supply to mines loading coal from tipples, open cars may, when requested, be furnished to wagon coal mines.

2. Where wagon coal mines dump coal into cars from elevated platforms under physical conditions such as to make the loading of box cars impracticable, open cars may be distributed on the same basis as to tipple mines.

3. Any special condition in connection with wagon mines on your line that seems to warrant further deviation from the letter of this rule may be reported for consideration.

Annual Convention of Railway Fuel Association

Under Auspices of United States Railroad Administration and United States Fuel Administration

"SAVE COAL, OR LACK IT," was the keynote of the opening session of the tenth annual convention of the International Railway Fuel Association. This convention, which is being held with the co-operation of the United States Fuel Administration and the United States Railroad Administration, opened on Thursday, May 23, at Chicago. The first meeting was held in Cohan's Grand Opera House.

Several changes were made in the list of speakers for the first day's session as originally announced. C. R. Gray, director of the Division of Transportation, United States Railroad Administration, was unable to be present, and R. H. Aishton, director Western Regional District, United States Railroad Administration, addressing the meeting in his stead. Sir George Bury, chairman of the Canadian Railway War Board, was also unable to attend but was represented by Thomas Britt, general fuel agent of the Canadian Pacific Railway.

Practically every railroad company in the country designated representatives to attend the convention and there were also present a large number of coal operators and other representatives of the mining industry.

The convention was opened with an introductory address by the president of the association, E. W. Pratt, assistant superintendent motive power and machinery, Chicago & Northwestern. Mr. Pratt spoke in part as follows:

President's Address

E. W. Pratt, president of the association, spoke in part as follows: "Subsequent to our last convention the executive committee of the association made offer of itself, our individual membership and the entire machinery of the organization to the United States Railroad Administration and to the United States Fuel Administration. The offers were accepted and representatives from each department were assigned to co-operate with us. We want you to leave this convention so imbued with the patriotic spirit that when you go home you will carry on the movement for more and better coal and its economical use. As individuals we take a back seat for no one when it comes to patriotism, but it has been my experience and observation that we know not always wherein our individual duty lies nor can we sense its importance in the big game. We are wont to say, 'What's the use of the extra exertion to save a shovelful of coal when another can save a ton?' 'What's the use of unloading a car of coal a day earlier when we see trains of coal remaining unmoved daily?' 'What's the use of firing a locomotive with care when the train despatcher holds us an hour on a siding?'—a delay which seems to you avoidable, 'Why repair a car today by extra effort when there will be "just as many" tomorrow?'

"Some of us can do more than others, but all of us have it in our power to a greater or less degree to help win the war by doing our best. It is not expected that the miner will do as much as the operator, but both can do wonders in the improvement of the quality of fuel coal if their heart be in it. The stationary fireman can do less toward fuel economy than the manager of the plant who can provide efficient devices. Neither can the locomotive fireman save as much coal on his one engine as can the train despatcher with dozens of trains on a single track road, but each can do and must do his part.

"There is no time for any of us to count his performance with respect to what the other fellow is doing. If the other man fails that is no reason for letting up on our own efforts.

"The largest single item of railroad expenditure, other than labor, is for fuel, and yet we know that much fuel is wasted on every railroad. The railroads of the United States use over one-quarter of all the coal mined, and being such extensive users of this commodity, valuable in time of war far beyond dollars and cents, it devolves upon those of us who are laboring for the railroads to exert ourselves to secure the utmost economy. Ask the average locomotive fireman if he can, by close attention to his work, save a shovelful of coal a mile and he will say, 'Sure I can!' Suppose he were firing a locomotive over in France on the United States military railroad with coal costing anywhere up to $150 per ton, and he would surely tell you he could save still more.

"It is stated that in the year 1917 fifty millions tons more coal was mined in this country than in the year before we entered the war. That sounds good, but let us consider the facts: Experts calculate that there was enough slate, bone and dirt in 650 million tons of coal mined in 1917 to nearly offset the apparent increase of 50 million tons. It means that it took one million more coal cars to haul this 50 million tons of slate and rock from the mines to the users, a tremendous loss in economical firing due to ashes and clinkers, and another million cars (or its equivalent in wagons, barges, etc.) to haul them away. The miner might say that it would give him less earnings during the year to pick the coal well, and the operator might say it would give him less sales for the year, but I contend that this is not true. The output of both miners and the mines will without doubt this year be limited by the car supply at the mines, as has been the case for the last few years, and it should be borne in mind that the railroads are not responsible for this condition, but the public policy toward them for the past decade.

"There are three items in this tremendous fuel problem—production, transportation and consumption—and the railroads of this country are largely responsible for all three of them. For production in so far as concerns the delivery of machinery and supplies to the mines and a car supply for the coal produced; but the miners and operators both can do much in this particular. How often have the mines dropped empty cars by the shaft for some trivial reason? If there be refuse in the cars, a hole in the floor or sides, a brake chain broken, how little effort on their part would avoid this loss of use of one or more cars for a whole day? I venture to say that this trivial item amounts to several thousand of coal cars each day.

"The next item is transportation, largely by rail, some by water. Railroad men are a hardy and earnest lot and not easily discouraged, working every day in the year, including Sundays and holidays, that their task may be accomplished with credit to themselves, their employers and to their country. But when last winter, after weeks of continued and unprecedented snow and cold, their locomotives were compelled to operate with added disadvantages of poor and dirty coal it was perhaps the greatest obstacle of all and many a locomotive died and its train was abandoned for this reason. I have yet to see a miner or operator who would defer to the railroad man in the matter of patriotism or loyalty to country, and I believe if the proposition is put squarely up to the men that there will be no Sundays or holidays in either

the mine, on the railroad or in the coal yard when it concerns the output and distribution of coal, any more than there is Sunday or holiday in the trenches with the Hun facing our boys and the Kaiser menacing our free institutions.

"Were the railroad problem purely one of handling coal, it would indeed be simple and easy, but with vast quantities of foods and materials to move it is greatly complicated.

"The zoning system inaugurated by the United States Fuel Administration will save thousands of coal cars per month. This must needs be, yet it will be only a drop in the bucket compared with what we can accomplish by all pulling together. It is calculated that the average car in coal trade only makes a round trip from the mines to the coal shed once a month. Reduce this time at the mines, on the repair tracks, on the road and at the coal sheds; this we must do to help solve the problem.

"The 27 per cent of the coal produced which is used by the railroads is so large that we hope by care and close attention to details not only as to firing but in better repair of locomotives, more care in despatching and moving trains, through the shop should be continued as far as possible, considering the scarcity of materials and skilled labor to apply them. The locomotive feed-water heater also offers an attractive field for economy and efficiency and well warrants careful and continued experimentation.

"There is every indication of a greater shortage of coal next winter than we had last unless production is increased and great conservation is practiced and let it not be possible for anyone to point the finger at you or me and say with any degree of justice—there is a slacker."

The Railroad Industrial Army

By W. S. Carter,

Director, Division of Labor, U. S. Railroad Administration

Mr. Carter was unable to attend and the address prepared by him was read by Eugene McAuliffe, manager of the Fuel Conservation Section, United States Fuel Administration. Mr. Carter's address was in part as follows:

E. W. Pratt, President, Railway Fuel Association

Frank McManamy
Director, Division of Locomotive Maintenance, U. S. Railroad Administration

Robert Quayle
General Superintendent, Motive Power and Car Department, C. & N. W.

E. N. De Groot, Jr.
Assistant Manager, Car Service Section, Division of Transportation, U. S. Railroad Administration

W. S. Carter
Director, Division of Labor, U. S. Railroad Administration

and better operation on the part of the engineer, to save millions of tons of coal and millions of gallons of fuel oil. Superheating has been proven practicable and each locomotive so equipped saves hundreds of tons of fuel per year besides rendering faster and better service; hence, the present practice of superheating the larger locomotives passing

We are told by those who know that it requires four tons of shipping to maintain one American soldier in France. We are told by those who are determined to win the war that by the spring campaign of 1919 we will have more than two millions of our boys "over there," and as the war progresses more and more ships will be required to trans-

port across the sea food and munitions with which to maintain our fighting force. Not only the winning of the war depends upon this ceaseless flow from our farms and our factories to the battle front but without it the men we send to France in freedom's cause will be sacrificed.

When we talk of this stupendous movement of war supplies we seem to think only of ships but little thought is given to the fact that upon our railroads these ships must depend for cargoes and bunker coal. The reason that we have not more fully recognized this fact is because heretofore the capacity of our railroads has exceeded that of our ships. We read from day to day of the splendid developments of the ship building industry, and the day is not distant when our ports will be crowded with ships in readiness to perform their part in this great transportation problem. When that day comes we railroad men will have a rude awakening. No longer may we conduct our business affairs and maintain our conditions of labor as in the days of peace.

Without yielding their laudable purpose to limit a day's work to eight hours when this war is over the American working people must now work as long each day as the war's necessities demand, compatible with their physical well being. So long as brothers and sons of American working people are dying in France for our liberty none of us will hesitate short of our greatest effort. Business men must no longer profit out of our country's misfortunes. Great wealth accumulated during this war will not be the product of patriotism. With millions of men now under arms in France, with thousands of ships ready for cargoes and bunker coal, railroad men will soon realize that truly they are a component part of the American expeditionary forces. In fact they are now a great industrial army. Their failure to maintain an efficient line of transportation will cause ships to lie idle in our harbors and deprive our battle line of munitions and food.

A breakdown in the efficiency of our railroads here when the crisis comes will be no less disastrous than a rout of one of our armies in the great battles that must be fought before the war is won. I shall not attempt to tell each railroad man what he should do to avert the possible collapse of our transportation system when it is put to a crucial test. Each and every railroad man's conscience will tell him that.

I know that the railroad employees of this country will not be lacking in the performance of their duty to the nation and to those who go across the sea to win or die. My confidence in and my knowledge of railroad men assures me they will do their part. If the railroads fail when they should be most efficient I cannot believe that the fault will lie with those men whose uniforms are overalls. When our children's children read the stories of the part played by America in the great war for liberty they must find there also recorded that the railroad men of America realizing that upon them had fallen the burden of transporting troops, munitions and food far beyond their normal capacity worked as no men had ever worked before and thereby maintained an uninterrupted medium of transportation without which the war could not have been won.

Relation of Locomotive Maintenance to Fuel Economy

By Frank McManamy,
Manager Locomotive Section, United States Railroad Administration.

Fuel economy and locomotive maintenance in practically everything that relates to efficient locomotive performance, are synonymous terms. Within recent years the increasing cost and scarcity of fuel have made fuel economy a question of major importance to the designer of locomotives as well as to the officials in charge of locomotive maintenance. The inventor has also turned his talents in that direction, with the result that the superheater, the brick arch, the combustion chamber firebox, and other fuel saving devices, are today parts of the equipment of every modern locomotive. The influence of these devices in effecting real fuel economy is tremendous, and their application to many existing locomotives will result in a marked reduction in fuel consumption.

The largest possible measure of performance can be obtained from a locomotive only by giving constant and careful attention to locomotive maintenance. Locomotive maintenance is not only related to fuel economy, it is fuel economy. What is meant by a locomotive in good condition? It means a boiler which generates steam economically but freely, proper steam distribution to the cylinders and efficient mechanism for transmitting the power developed in the cylinders to the only place where the power of the locomotive can be measured—the drawbar at the rear of the tender.

The boiler, to promote economy of fuel, must be properly designed, with ample grate and heating surface. It must be clean, the grates level and easily shaken and in good condition, the ash pan and grates must have ample air openings to aid combustion, the firedoor should operate easily, and the fire tools should be in good condition. The flues must be clean, the flues and firebox free from leaks, smokebox must be air tight, the smoke stack and nozzle in line, and the draft appliances in good condition and properly adjusted.

Too much stress can not be laid on the necessity for keeping boilers clean, because in addition to effecting a material saving in fuel, it increases the efficiency of the locomotive and materially prolongs the life of the flues and firebox sheets. Frequent and thorough boiler washing is the foundation of proper boiler maintenance. Authorities differ somewhat as to the exact loss due to scale on boiler sheets but a comparison of tests made indicate pretty conclusively that 1/16 in. of scale will increase the fuel cost approximately 15 per cent and that ¼ in. of scale will increase the fuel cost approximately 60 per cent.

It is not an exaggeration to say that on an average 40 per cent of the locomotive boilers in service have scale 1/16 in. thick or to say it differently, that due to poor boiler washing all of them have 1/16 in. scale 40 per cent of the time, and that many have scale from ⅛ in. to ¼ in. in thickness. In fact in some districts it is not unusual to find ½ in. of scale on boiler sheets. Let us see what this means in actual figures. In 1918 it is estimated that the railroads will require 166,000,000 tons of coal at an average cost of $3.50 per ton, which will be a total of $581,000,000. If we add to this 48,000,000 barrels of fuel oil it will make the total fuel cost over $650,000,000. We will pay, therefore, during the year of 1918 more than $50,000,000 for fuel on account of the scale in locomotive boilers that many men do not consider of sufficient importance to warrant its removal.

But even a boiler that is clean and in the best of condition can do no more than generate steam; proper steam distribution to and from the cylinders must be had and the steam made to do effective work. If the valves are out of square or blowing or the valve gear badly worn; if valve chambers or cylinders are badly worn or out of round; if the cylinder packing is worn or broken; if leaking piston rod packing or leaks about the steam chests or cylinders dissipate the steam that should and could be made to do work, we can expect no improvement in our fuel performance.

Assuming, however, that the boiler is in good condition, that the steam distribution is good, and that there is no waste of steam through steam leaks, it remains to deliver this power at the drawbar, and this can not be efficiently or economically done through the medium of wornout machinery. Rods in

bad condition, boxes loose on journals, wedges which require adjusting, and tires badly worn which will cause excessive slipping, are poor mediums through which to transmit energy.

Some of the repairs which will do the most towards reducing the fuel consumption and improving locomotive performance arranged in what is believed to be the relative order of their importance, are, setting the valves properly and maintaining the valve motion, washing the boilers, keeping the flues clean, eliminating steam leaks about cylinders and steam chests and maintaining the driving boxes and rods.

Each locomotive represents a certain definite investment on which a return must be made. This can be done only by maintaining it in a condition to accomplish maximum results in the way of locomotive performance. If it were possible to calculate the aggregate loss in operating efficiency for the total number of locomotives that due to lack of maintenance are operating at less than their maximum efficiency, the result would be staggering, and when we add to this enormous loss of operating efficiency, from 10 to 20 per cent of the railroad fuel bill which for the past year was $329,000,000, and for the current year is estimated to be $581,000,000 for bituminous coal alone, we begin to realize the price we have been paying for the privilege of operating defective locomotives and delaying traffic thereby. This being true, the question that must inevitably follow is, what is being done by the U. S. Railroad Administration to remedy the conditions which have been described.

The first step before taking action to bring about an improvement in the condition of locomotives was to make a survey of the field. The next step was to speed up locomotive repairs to provide motive power to meet the immediate needs and this was done by increasing the shop hours about 16 per cent for over 200,000 men, and by nationalizing locomotive repairs so that a locomotive in need of repairs would be sent to the nearest available repair shop, thus utilizing to the fullest extent the total shop capacity of all railroads. The result of this soon became apparent in the increased number of locomotives turned out of the various shops which for the four months ended April 30, increased 6,849 over the corresponding period for last year. This not only means more locomotives but it means better locomotives, which both increases operating efficiency and decreases fuel consumption.

For the future the work that has been started will be continued and a higher standard of condition of locomotives required. A regular schedule for the application of superheaters and other fuel saving appliances to locomotives not new equipped, is being prepared and will be adopted subject only to labor and material being available.

Next to wages the fuel bill of American railroads constitutes their largest single item of expense. Locomotive maintenance is the only method of conserving fuel that will of itself show a net profit, in addition to the fuel saved. Every item of maintenance that makes for fuel economy also promotes operating efficiency and increases the life of the locomotive. Therefore, the good effects of maintaining locomotives are cumulative, and the bad effects of failing to maintain them, increase in the same ratio.

Today, with the increased demands for fuel by reason of the war and the necessity for furnishing fuel to our allies; with the increased use of fuel in industries whose output is essential to the successful conduct of the war, the saving of fuel by better locomotive maintenance and the increased operating efficiency which will result therefrom, means more than can be expressed in terms of tons, gallons, or dollars. It means the saving of America, the saving of Democracy, the winning of the war.

In the conservation of fuel by better locomotive maintenance, as in all other matters relating to transportation, the United States Railroad Administration, and the railroad men of the country who are solidly behind it, can rightfully adopt as their motto, "We will deliver the goods."

The Motive Power Department and Fuel Economy

By Robert Quayle,

General Superintendent Motive Power and Car Department, Chicago & North Western

In 1917 the railroads of this country consumed approximately 175,000,000 tons of coal. This, at an average price of $2.50 a ton, would give us a cost of $437,500,000. Now, I maintain that if every individual in the operating end of the railway organization of this country were to work together as one man, each helping the other to the one end of saving fuel, we could easily save 10 per cent, which would be 17,500,000 tons equivalent to $43,750,000.

I want, first, to call attention to the master mechanic's part in this game of saving fuel. It is your duty to know what is going on on the division or the divisions that you represent. You should be in touch with your division superintendent and train despatchers in such a way as to make them feel and really know that you are interested in them personally, that you are interested in their welfare. Men can always do their best work when they do it cheerfully. It is the master mechanic's duty to be so in touch with his shop man and engineers and firemen that they will have confidence in him, and he should have the happy faculty of having the men constantly feel kindly toward him. This would enable him at once to get the best from the men that can be had. Kindly treatment always begets bigger and better results than the opposite sort of treatment.

You should fix the machines that the men are going to handle, so that the men will have the least amount of discouragement in their work, and there will be the least amount of effort on their part necessary to get the best results. To this end you should have your men trained to make proper reports of necessary work to be done. You will find that occasional meetings with your roundhouse foremen, particularly calling attention to these things, and insisting upon their having the work done that is reported, will bring about good results, and your engineers encouraged by that method will take much more interest in making the detailed reports than they would if their reports were not given proper attention. Give every encouragement you can to all your men. By so doing you make them grow bigger and better, and the results increase as the men grow.

My next thought is the traveling engineer. His real importance on a big job, such as his is, is not often placed in the class wherein it belongs. What are his duties? To make inspection of locomotives; see that they are in proper condition to do the best work. He should know the condition of every engine in his charge. He should know what they are capable of doing. He should see to it, at the roundhouse end, that the engines leave fully capable of making the trip successfully and economically. He should always have it in mind that his job is one of helpfulness and instruction, rather than one of fault finding and improper criticism. The result will be that every man then will measure up to what is properly required of him, and will do his part to the very best of his ability.

The roundhouse foreman, as a rule, is the most abused man on a railway. He is up against all kinds of conditions, all kinds of cares and troubles, all kinds of problems to work out, in order that everything may move smoothly, keep every man one at peace with the other, and get every locomotive repaired and put in condition for its trip. His duties are multitudinous, not only in so far as the mechanical end of it is concerned, but in so far as the personal end of

it is concerned. We require a good deal of the roundhouse foreman, and to be a successful roundhouse foreman, to get the very best out of his job, he should be gracious, he must needs be a philosopher, he must be a student of human nature and he must smile even when everything goes "dead wrong."

Locomotive engineers and firemen, what a magnificent opportunity you men have to show your patriotism by your work! Study every day "What can I do to help Uncle Sam out in this crisis?" Coal is scarce. I need not tell you what people had to do last winter to get coal to keep themselves warm. Industries were restricted in the amount of fuel that they had formerly used, because of conditions generally existing in this country at that time. On the basis of your loyalty and faithfulness I am asking you to redouble your efforts; increase your intelligence not only for yourselves, but strongly urge every other fellow not only to do his bit, but to do his all, that fuel will be conserved and utilized, not wastefully, but with the highest economy and efficiency, that our nation and our allies might not suffer for the want of fuel. Fuel is now playing and will play a most important part in our warfare.

Work your engine most economically, consistent with the work that you have to do. Keep your eye on the coal pile in your tank. Watch your firemen. Do not flood your engine one time and have your crown sheet almost bare another time. Do not climb your hills 100 miles an hour and put your brakes on going down the other side. I know, of course, that very few men do these things in the extreme, but it is the careless, indifferent man that must be brought up to the standard of the best men.

The firemen can do much on their job to save fuel, and they will do much, if we put it to them right. When a piece of coal is in the gangway, instead of kicking it off, if you would do like our best men do, put it where it belongs. Don't keep the fire door open, and shovel ten or fifteen scoops of coal in at a time, without closing the door and then get up on your seat and let the black smoke roll out, and think you are doing fine. You all know that the fellow on that engine is a slacker and not a good soldier. When you find a man like that, do your bit and call his attention to it and tell him we are at war, and if he does not know it tell him coal is scarce and the demand is greater than the supply. Knowing that, I believe that he, too, will join the ranks for economy; that he, too, will go out and talk and work, and, if need be, fight, that every pound of coal will be saved.

You will observe that what I have said can be summed up in a word, co-operation, and I am sure when we of the motive power department will have done our part that the men at the other end of the operating department will say to us, "You have done well." Then we are in a position not only to solicit, but practically to command, their co-operation, and they, too, will help us get better results, because human nature is the same the world over. We all respond to success, and when one department has shown a great improvement the other fellows will not only follow in the wake, but they will try to beat them out in the end if they can.

Co-operation means, on a railway, every man of us in every department helping every other man in his own, as well as in every other department, to the end that they as a railway might be bigger and better, more useful and more serviceable to the country in which we live than any other railway.

My appeal in closing this address is that every railroad man here will take another hitch in his belt, roll up his sleeves a little higher, think more deeply, more earnestly, work a little harder, fight a little better for the conservation of fuel and for the Government by which we are employed, and for Old Glory, which stands for bigger and better things than any other flag in the universe.

The Transportation Department and Fuel Economy

By E. H. DeGroot, Jr.,

Chief, Bureau of Car Service, Interstate Commerce Commission, and Assistant Manager, Car Service Section, United States Railroad Administration.

Fuel is absolutely necessary to the production of raw materials. It is essential to the manufacture of those materials into products and without it there would be no transportation as we now understand the term. Coal and more coal, then, must be our slogan.

That Nation which lags in its coal supply must lag in its fighting! We must win the war! What will it profit us, though we send our boys to the battle fields by the million, if we at home waste the coal needed to support them adequately with supplies and munitions or upon which our gallant allies are dependent to enable them to hold out?

And what can we of the transportation department do to help in this? What ladder iron can we grab that we may get a foot in the sill-step and climb to the deck of opportunity in this crisis? Well, the locomotive is in the hands of the transportation department from the time it leaves the turntable at the initial point until it is turned in over the cinder pit at the terminal, and during this period it offers splendid opportunities for patriotic railroad men to co-operate to the end that the work which it performs may be done with a minimum of coal consumed.

Steam saved is coal conserved. The air compressor on the modern locomotive is a powerful engine. It performs wonders which are little enough appreciated by most of us but it has a frightful appetite for steam—and steam means coal. Its cylinders are large, necessarily so because of the exacting nature of its work, and as its load increases directly with the progress of the piston, the steam cannot be used expansively but must be admitted to the very end of the stroke, there to be exhausted and a fresh draft made upon the boiler. Under these circumstances, air leaks constitute a direct drain upon the boiler and so reach their greedy fingers back through the firebox into the precious coal pile. There is no way in which the trainman can contribute so much toward the good cause of saving coal as by stopping the train-line leaks before starting on the trip. With porous hose, worn gaskets, pipe and other leaks, what the pump has to overcome needs no description among practical men.

Leaks are crimes when coal is a military necessity! To stop leaks then is of the greatest importance and this should be done carefully and conscientiously. Surely, any man who does less than he can, does less than he ought in this. The practice of carrying a hose-gasket or two in the pocket as some trainmen do for this purpose is an excellent one. Rainy weather offers an opportunity to locate hose which are porous to a serious extent and by changing them when opportunity offers much fuel may be saved which would otherwise be wasted.

But all of the leaks are not discoverable while the train is at rest, particularly in cold weather, and new ones develop during the trip. These should all receive first-aid treatment as soon as found. Then, too, the leaks may result in sticking brakes and this condition is like compounding a felony. It not only takes much coal to pump against the leaks but much more coal at the same time to pull against the brakes.

Nothing has been said about the share which the engineer and fireman may have in this good work for the reason that other speakers will cover these points, but in passing it should be noted that the opportunities for co-operation between enginemen and trainmen are many and that advantage should be taken of all of them. One way to co-operate to good advantage is by being ready to leave the house promptly at

the hour for which called, thus affording maximum time in which to pump up the train, look for and repair leaks and properly test the brakes.

So much for trainmen. Now how about the superintendent? Well, with him individual interest is indispensable! If he does not take an active interest in fuel conservation it follows as the night the day that the value of the transportation department as a factor in saving coal on *that* division will be very small. On the other hand, when the superintendent manifests keen sympathy with the movement, the men for whom he is responsible will contribute no small share toward the success of the movement. In short, the other transportation officers and the employees on the division will form their estimate of the importance of the movement very largely from his point of view. Fuel costs form the largest single item of transportation expense, and fuel economy should interest every superintendent as a fundamental of successful operation, but I want to place it on a higher plane than this, meritorious though it be,—the plane of patriotism!

Our boys are laying their lives on the altar—making the supreme sacrifice cheerfully and unafraid, as Americans have always done in the testing time. It is no longer a question whether the sons of a decadent age are worthy of their sires, but a burning question whether we fathers of America are worthy of our noble sons! And these sons will judge us—those who come back. How shall we meet them if we have betrayed them in the matter of the fullest support—or like Peter, followed afar off?

Experience on different roads has demonstrated that one of the very best ways to develop interest in fuel economy is through the agency of employees' meetings held at convenient times and places and attended by the superintendent, the road foreman and, as may be practicable, by the trainmaster, despatchers, stationmen and any others interested—as well as by enginemen, yardmen and trainmen. Attendance upon these meetings should be purely voluntary and the discussion of all subjects, including that of saving coal, frank and friendly.

Where the attendance is general, that is, not restricted to any particular class or classes of employees, there is insured a wide-spread appreciation of the importance of the subject and its place in the great war program of the nation, which is very helpful indeed. Some roads report that at meetings of this description they regularly have a hundred men or more in attendance.

The trainmaster has a fine chance to make a substantial contribution to the cause as he goes about the division, through his contact with the men and the resultant opportunities for educating and enthusing them, as well as by his ability to correct conditions which result in waste of fuel, or to have them corrected. With the yardmasters he is in position to have trains so made up at terminals as to minimize switching en route, remembering that to keep trains moving kills two birds with one stone; reduces overtime and *saves fuel.* In short, his active co-operation is of great value in this important work of fuel saving and his responsibility correspondingly great. By ordering trains for a time by which they can be made up by yard crews and at which they can get out without being delayed by other road movements as well as with a view to expediting their passage over busy stretches of track where other trains might interfere if the call is made without sufficient forethought, chief train despatchers and yardmasters can render no little assistance.

Long delays to freight trains on sidings often result in bad fires and leaky flues, both of which increase the amount of coal which must be burned in order to overcome the handicaps which they present. Train despatchers and trainmen by close co-operation can avoid many of these detentions and with a knowledge of how vital to the nation the conservation of coal is at this time, should do their best to avoid such detentions.

Telegraph operators also can help by keeping despatchers advised as to conditions affecting the movement of trains and their location so that orders may be issued advantageously and the despatching done in such a manner as to involve a minimum of delay.

In fact, fuel economy is like a Liberty Loan, everybody on the division from superintendent to call-boy should glory in having a share therein.

What has gone before pertains to the saving of coal after it has been mined and distributed. Now just a word about a big opportunity which comes to transportation men actually to make possible an increased production of coal by the miner. I refer to the chance to get cars to the mines and place them in time to save a day in their loading. Every man who in any way expedites the movement of a coal car, loaded or empty, helps in this and should realize that he is making a contribution of service which is of great importance even though he may not see the result. Men composing mine crews, however, have a fine chance not only to play the game but also to see the result by making every possible effort to place the cars for loading by the time and in the numbers that they are required under agreements between mine operators and miners, co-operating heartily with both in an endeavor to make possible the loading of a maximum member of cars each day. They can further hit the Huns by pulling the loads promptly and switching them for movement as early as possible, thus expediting the movement outbound.

Careful handling of coal loading equipment both in mining territory and elsewhere is another way in which an increased supply of cars for the movement of fuel may be secured, while careless handling, on the other hand, resulting in damage as it frequently does, means the withdrawal of instrumentalities from service which can illy be spared at this time.

The addresses of R. H. Aishton, Thomas Britt, W. S. Stone and the addresses given at the closing session on May 24 will be published in next week's issue.

INCREASED RAILWAY RATES IN EGYPT.—An Exchange telegram from Cairo states that the fares on the state railways of Egypt have been increased 50 per cent, being 100 per cent increase on the pre-war rates. Freight rates have also been increased from 50 to 150 per cent.—*Railway Gazette, London.*

RAILWAY BETWEEN THE MALAY STATES AND SIAM.—Advices received by the Malay States Information Agency are to the effect that the railway connecting British Malaya with Siam was nearing completion, and that it was expected that through passenger traffic between Singapore, Kuala Lumpur, Penang and Bangkok would begin on April 1. As a matter of fact, trains conveying officials of both countries had already been run over the line between Kuala Lumpur and Bangkok, and it was only the difficulty of obtaining certain ironwork that has prevented an earlier opening of the line to general traffic. One big bridge on the Siamese side had not been completed. The substructure had been built, however, and efforts were being made to get the metal work fixed up as soon as possible. The completion of the through railway is expected to have an appreciable effect on the Federated Malay States food problems, as the Siamese authorities are anxious to send through as much rice and other foodstuffs as possible when once the railway is open. Owing to circumstances due to the war, the through service will at first be of a modified nature, and it is not likely that there will be more than one passenger train daily each way till the war is over.

The Air Brake Association Convention

THE PROCEEDINGS OF THE FIRST DAY'S session of the Air Brake Association convention appeared in last week's issue on page 1245. A brief abstract of the later proceedings follows:

Preparing Air Brakes at Terminals

Installation.—The brake cylinder and auxiliary reservoir should be bolted to the most rigid portion of the underframe and all points of fastening should be equally rigid to avoid twisting or cramping under stresses of brake applications. All air brake piping should be securely clamped to prevent shifting when cars are subjected to shocks. This will avoid many broken or distorted cross-over pipes, loose pipe joints and other causes that produce excessive leakage.

Maintenance.—If the man in charge is to be successful in supervising air brake work, his knowledge should cover the following points: He should know when a triple valve is applied to a car that has been properly repaired, cleaned and tested and is suitable for service. A brake that is tested by making a service application, the reduction of brake pipe pressure being made at the proper rate, will often fail to apply or remain applied, while if it was tested by making the reduction at an excessive rate, which may still be less than required to produce an emergency application, the brake will apply and remain applied. Hence, the importance of testing brakes with a service reduction at the proper rate, this to insure the condition of the brake being such that it will apply and remain applied when placed in the train.

The application of levers of improper dimensions and proportions causes brake-rigging failures, slid flat wheels, improper and unequal braking power and a detrimental influence on train handling. Changing brake shoes without readjusting to between seven and eight inches standing piston travel is often the direct cause of slid flat wheels, break-in-twos and train shocks. Permitting cars to leave shop or repair tracks without hammering and blowing out the brake pipe is not treating the triple valve on the car or other cars in the train in a manner conducive to good operation. Applying triple valves to cars without first seeing that branch pipe strainers are inserted and in good condition and failure to clean out dirt collectors at proper intervals, deprives the triple valves of the protection they are entitled to and causes numerous triple valve troubles.

Inspection Tests.—In making initial inspection tests and retaining valve and brake cylinder tests the committee emphasized the need of giving especial attention to the condition of all piping at points where wear or corrosion is apt to take place. It should be determined that all pipe clamps and nuts on bolts holding cylinders and reservoirs are securely in place. A 90-deg. bent nipple with each leg approximately six inches long, instead of an elbow, should be installed at the triple valve end of the retaining pipe and the pipe should be clamped not closer than six feet from the triple valve to provide flexibility and should be clamped about every six feet from this point to the retaining valve. But one union should be used in the retaining pipe, located at the end of a 90-deg. bent nipple 12 or 14 in. from the triple valve.

Triple valves that do not apply with a service reduction; that apply quick action with a service reduction, and those that have leaks at the exhaust ports should be removed and replaced with others which have been cleaned and tested in accordance with M. C. B. practice. Brake cylinders that have leaky packing rings, and the brakes that have not been cleaned for eight months on system cars or 12 months on foreign cars should be cleaned, repaired, tested and stenciled in accordance with M. C. B. standard practice.

No train should be permitted to leave a terminal without a terminal test. In testing incoming freight trains at terminals the air brake and the general inspection must not be combined. On both leaving and arriving trains inspectors should rapidly examine the train for piston travel, brakes that fail to apply, brakes that have leaked off and brake pipe leakes. To insure inspectors ascertaining the condition of the brakes on arriving trains, switchmen, carmen and others must not discharge any air from the auxiliary reservoirs or brake pipes of cars that have not been inspected.

Brake Pipe Leakage.—Excessive brake pipe leakage is one of the most liberal contributors to train shocks and break-in-twos. It wastes air, takes away from the engineman the ability to control the amount of brake applications, contributes to brakes sticking, causes overheating of the air compressor and even prevents the maintenance of standard brake pipe pressure. The maximum leakage should not exceed seven pounds per minute, as determined by standard test. This test consists of making a reduction of ten pounds from standard pressure, lapping the brake valve and then noting the leakage during the following minute after the service exhaust ends. By observing the caboose gage during brake applications train men can often note the existence of excessive leakage.

The most common cause for brake pipe leakage is poorly clamped piping that will permit shifting in switch movements, or shocks that occur along the road. Allowing train and yard men to pull hose apart instead of separating them by hand, produces spread couplings jaws, destroys gaskets and creates porous hose.

Brake pipe is not the only leakage to be considered in our effort to eliminate shocks and break-in-twos. Brake cylinder and auxiliary leakage are just as productive of damage to trains as is brake pipe leakage. If a triple valve performs its duty and permits the desired pressure to pass from the auxiliary reservoir to the brake cylinder when the reduction is made and then, due to a bad leather in the cylinder or a defective gasket under the pressure head, the pressure is permitted to leak to the atmosphere, the effectiveness of that brake is either partially or wholly lost. On the other hand, if the brake cylinder and brake pipe are comparatively tight and we have a leaky auxiliary, either from a carelessly applied drain plug, a poorly fitting exhaust valve or a slide valve leaking, then after the application is made the auxiliary pressure leaks down two or three pounds below the brake pipe pressure, the brake will release and its efficiency is lost. Other factors that assist in producing leakage are brake pipes applied out of proper height and distance from the face of the coupler; nipple ends broken off and new threads cut on old nipples, shortening the brake pipe; angle cocks applied and not given the proper angle toward the center of the track.

Defective Triple Valves.—Any number of cases have come under the observation of the writer, when with the brake pipe and auxiliary fully charged the trainman in separating the train would close only the angle cock on the portion of train to be moved, leaving the other one open, and then pull the hose apart, setting all the brakes in emergency on the standing portion of the train, regardless of its length. Repeatedly applying brakes in emergency in this manner is frequently the cause of bent emergency piston stems.

Undesired Quick Action.—Undesired quick action can be caused by permitting triple valves to become dirty and gummy to the extent that the piston sticks to the bushing so that a high differential must be brought about to cause it to move. It can also be caused, especially with long trains, by a very light brake application or a very slow reduction, produced by lapping the brake valve and allow-

ing brakes to leak on, where it would be avoided by braking according to proper methods.

How Train Shocks May Be Eliminated.—To prevent, as far as possible, damaging shocks in long trains due to brake applications, it is necessary that the percentage of braking power be as near uniform as possible on all cars, and that loaded and empty cars be so distributed that the greater part of each will not be at the head end or rear end of long trains. This provides a means of distributing the braking power so that reasonably good handling of the train can be expected.

Long piston travel is preferable to short piston travel. A seven-inch standing travel will provide much better handling trains than a five-inch standing travel with the same brake pipe reduction, because in the former case the cylinder pressure will be built up more slowly and consequently any movement of slack in the train will take place proportionately slower, with a reduction in the velocity difference between cars and the stresses thereby set up. While there will be a considerable difference in the cylinder pressure between a five-inch and seven-inch travel at the beginning of a brake application, the pressures will be nearly equal when the brake is fully applied. If the piston travel is short, say five inches, it is possible to develop a high brake cylinder pressure at the head end with a 10-lb. reduction before the beginning of brake application at the rear. This causes the slack to run in from the rear, sometimes with very damaging results if the speed is low. If the piston travel is long, say eight or nine inches standing travel, it is possible to make the same reduction and produce only 20 to 25 lb. cylinder pressure, less than one-half the pressure produced with the short piston travel. This reduces the rate of retardation set up on the head end of the train, and consequently the severity of any slack action due to a run-in of the slack. Lighter brake pipe reduction still further reduces the cylinder pressure developed, until the train can be controlled without any noticeable slack action.

Excessive Draw Bar Slack.—Another liberal contributor to train shocks and break-in-twos is excessive draw bar slack. The inspector should be instructed to watch this closely and make every effort to have cars with undue draw bar slack sent to the repair tracks for correction. With no slack and good draft rigging, trains could not be broken in two. The same can be said with slack either all in or all out and held so. The damage arises from its sudden change. How heavy the shock will be depends mainly on the difference in speed that must instantly be made uniform and on the weight that must suddenly be altered in speed. Weight is important, but change in speed is more so, as a sudden change of three miles an hour will cause nine times the shock caused by a similar quick change of one mile an hour.

DISCUSSION

The members discussed measures that might be taken to keep the air brakes on freight cars in condition to render effective service. The necessity of setting brakes on incoming trains and stretching trains before starting from terminals was emphasized, and the practice of inspecting and cleaning brake cylinders and triple valves on team and house tracks, which is now followed by some roads, was endorsed as a means of saving much time to outbound trains and keeping cars in the train to destination. Higher standards of maintenance were urged by a speaker who told that inspection on one road showed that of cars off the tracks of the owning line 25.3 per cent were found to have ineffective brakes. It was moved to recommend to the M. C. B. Association that Rule 6 be supplemented by a provision permitting all roads to clean brake cylinders and triple valves on foreign cars sent to the repair tracks for other defects nine months after the previous cleaning.

Other Business

Reports were also submitted on the maintenance of 8½ in. cross compound compressors, on the maintenance and operation of the feed valve, on M. C. B. freight brake stencilling and on proposed changes in the recommended practice of the association. The conservation of material and supplies was discussed at Wednesday's session and the topic was assigned as the subject of a report to be presented at the next convention.

In addition to addresses by C. H. Weaver and D. R. McBain, short addresses were given at the opening session by W. O. Thompson of the New York Central Lines, Martin Beman, director of public welfare of the city of Cleveland and W. S. Stone of the Brotherhood of Locomotive Engineers. On Wednesday evening Walter V. Turner gave a lecture on freak inventions.

The treasurer reported the largest balance that the Association has ever had in its treasury, and the executive committee voted to invest $1,000 in war saving certificates. The secretary advised that the association's membership was now over 1,000.

The officers elected were as follows: president, F. J. Barry, New York, Ontario & Western; first vice-president, T. F. Lyons, New York Central; second vice-president, L. P. Streeter, Illinois Central; secretary, F. M. Nellis, Westinghouse Air Brake Company; treasurer, Otto Best, Nathan Manufacturing Company.

Photos from Underwood & Underwood, N. Y.

Scottish Troops Arriving in Italy

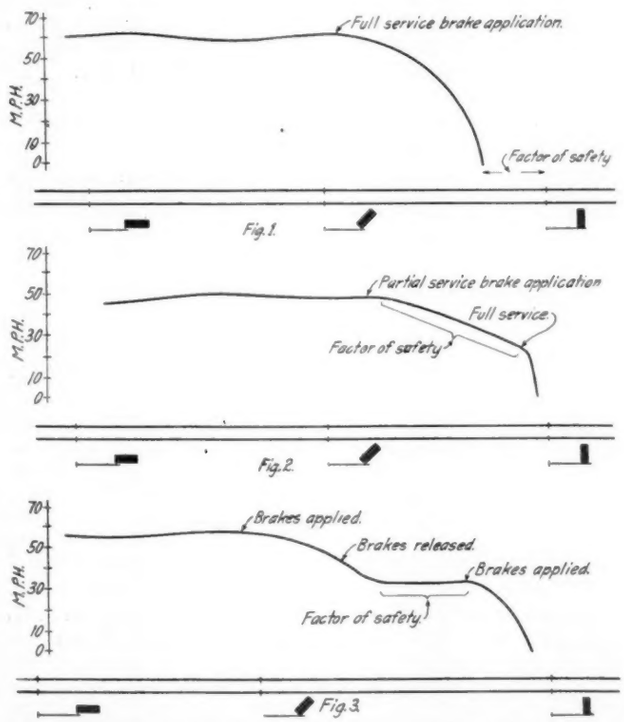
In Palestine

Relation Between Train Handling and the Caution Signal

By F. H. Nicholson,
Assistant Engineer, Signal Department, N. Y., N. H. & H. R. R., New Haven, Conn.

IT IS NATURAL ENOUGH to assume, in considering a signal stop, that the train is run at high speed to the caution signal, or to some point beyond it, where the engineman makes a carefully measured brake application and brings his train to rest just under the line at the stop signal. Not many signal stops are made in this apparently simple manner.

In the first place, to make such a stop with the necessary assurance requires a quality of judgment in speed, distance and braking power that is rarely if ever possessed by the most experienced engineman. No engineman can so closely estimate speed, distance, grade and braking qualities of his train that he can run at high speed to a certain point, make a full service brake application, and know that his train will stop at a definite and predetermined point in advance. If an engineman, basing his estimate of speed, distance and braking qualities upon normal conditions, runs at high speed to a certain point, makes a full service reduction, and stops

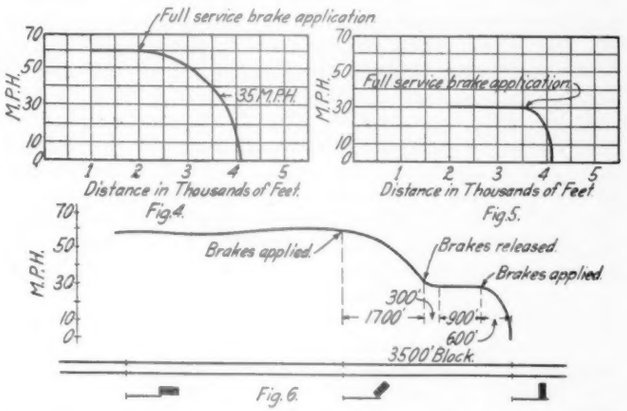


Factor of Safety Appears As Inaccurate Stop, Fig. 1; As a Partial Service Brake Application, Fig. 2; As a Free Running Period Between Two Braking Periods, Fig. 3

his train with the pilot of his engine just opposite the stop signal, he has realized his expectations, but he has nothing left for an error in judgment. The factor of safety is nil. To obtain a factor of safety, braking must be begun earlier, that is, at a greater distance from the stop signal. With the average train the factor of safety would then appear as a stop short of the signal; as a lighter brake application with probably more accurate handling of the train; as a combination of short stop and lighter brake application, or as a free running period in a two-application stop, which is probably the most accurate stop of all.

Accuracy, of course, is a valuable quality in train handling, and the engineman's intention is not to stop his train anywhere within the caution block, but quite close to the stop signal. It is only by stopping quite close to this signal that the most efficient use is made of the signal system; therefore, the first stop, in which the train is stopped a considerable distance from the desired point, and in which the factor of safety appears as an inaccuracy, is plainly not good practice.

If the factor of safety appears as a lighter brake application, there may be no factor of safety available when most needed. Through misjudgment of distance or speed the engineman may so encroach upon minimum braking dis-



Full Service Stop from 60 M. P. M. with 12-Car Passenger Train, Fig. 4; From 30 Miles Per Hour, Fig. 5; Two Application Stop from 60 M. P. H., Fig. 6

tance, that to avoid overrunning the stop signal he may finally find it necessary to put to work all the braking power available, and make what he would call a "parachute" stop; or he may even overrun the signal through inability to produce sufficient braking power when needed. The stop in which the factor of safety appears wholly as a lighter brake application is liable then to be an unsafe stop, and it is therefore not good practice.

If the train is stopped by the two application method of braking, the factor of safety appears as a free running period between two braking periods. The first brake application is made at a point and of a degree such that if maintained the train will be stopped a considerable distance from the desired point. The intention of the engineman is to stop at the signal, and since the first application if held will stop the train short of the desired point, the brakes are released after the train has been brought to an intermediate, or so-called controlled speed, and the train is allowed to drift for a certain distance. The engineman "proceeds with caution," and a well judged second application brings the train to rest with smoothness and accuracy at the stop signal.

The following records of train handling illustrate the three methods of braking, and the three forms in which the factor of safety may appear. Fig. 1 shows a stop in which the factor of safety appears as the distance between the signal and the point at which the train stops; in other words, the factor of safety appears as an inaccurate stop. Fig. 2 illustrates a stop in which the factor of safety is consumed in a lighter brake application, and this curve shows also that all the braking power available had to be used to avoid overrunning the stop signal. Fig. 3 is an example of a two-application stop, in which the factor of safety appears as a free running period between two braking periods. This record shows the smoothest and most accurate handling of the train, and represents best practice in train handling.

Since the two-application stop is made up of two braking periods and an intermediate free running period, the distance

required may be determined by constructing the complete speed distance curve to represent the handling of the train. The first section of the complete curve would show the deceleration following the first brake application, and it would be obtained from the 60 m. p. h. full service braking curve. This braking curve, representing a stop from 60 m.p.h. with a twelve-car train, is shown by Fig. 4. This and the following assumed braking curves are for level and tangent track only.

Records of train handling show that the first application is usually held until the speed has been brought to approximately 35 m.p.h. In other words, most enginemen consider 35 m.p.h a convenient speed at which to release and recharge the brake system. After a release of the brakes the speed may taper off to about 30 m.p.h. in a distance of from 200 to 300 feet. Then follows a free running period. The second brake application made from 30 m.p.h., brings the train to a stop according to the braking curve shown by Fig. 5. The complete speed distance curve may now be constructed.

If this speed distance curve, shown by Fig. 6, be applied to a 3,500-ft. block, and we assume that the braking is begun as the train passes the caution signal, and that the train is brought to rest as the pilot appears opposite the stop signal, the factor of safety in the handling of the train is represented by the distance of 900 feet. The nominal per cent factor of safety is $\frac{900}{1700 + 300 + 600}$, or 34.6 per cent, which seems to be a large enough factor of safety to care for the variable braking conditions found in passenger train service. With average conditions in train braking, a margin would also be left for a braking effort somewhat less than full service. It may be noted that the true factor of safety is greater than 34.6 per cent, since the shortest possible stop is a one-application full service stop, as shown by Fig. 4, in which the stop is made in 2,150 feet, the true factor of safety being $\frac{1350}{2150}$, or 62.8 per cent. This is the factor of safety for a one-application stop, but, as pointed out above, it is a factor of safety unavailable in its entirety unless the braking is begun at the caution signal, and if made available by early braking, the result with the average train is an inaccurate stop and an inefficient use made of the signal system.

The two-application stop, therefore, really makes available the nominal factor of safety in block length, and as a manner of braking it is the most accurate method of making the signal stop. It is evident, therefore, that where signals are spaced 3,500 feet to 5,000 feet—or even more, the spacing depending upon grade and curvature—and the speed is properly limited, the interpretation of the caution signal, "reduce speed at once and proceed with caution," conforms exactly with best practice in making the signal stop. The interpretation, "approach next signal prepared to stop," leaves to the engineman the fixing of the point at which braking shall begin, aand there is a temptation to run for a distance into the block at high speed, and to delay braking until the stop cannot be made without overrunning the signal, except by a heavy single brake application and a "parachute" stop. The factor of safety may be completely consumed in the distance covered at high speed, and if through some unknown defect there is less than normal braking power available, it may be impossible to stop without overrunning the signal.

Several of the curves are records of actual signal stops made in accordance with the first interpretation of the caution indication. They are typical of the results to be obtained where the caution signal means "reduce speed at once and proceed with caution." It is apparent that where signals are spaced with due regard to braking distance, the interpretation of the caution signal, "reduce speed at once and proceed with caution," brings into real agreement the language of the caution signal and the normal action of the engineman in making a safe and accurate stop, and insures that the designated factor of safety for each block will become an actual factor of safety in the handling of the train.

RESTRICT LONDON TRAVEL.—Sir Albert Stanley, President of the British Board of Trade, announced in the House of Commons on May 8 the decision of the government to place great restrictions on travel in London and vicinity, which will be extended later throughout the country. Passenger train service, he said, would be reduced by 40 per cent, and it will be necessary for every one to show that his proposed trip has an adequate reason.

FRENCH LOCOMOTIVES AND ROLLING-STOCK.—In an article given in its issue for March, La Technique Moderne reviews the duty required of the steam locomotive, the effect of superheat and compounding and the working of the locomotive boiler, and states that the reorganizing and development of railway transport in France are among the most urgent problems to be solved not only after the war, but even at the present time. It will be necessary shortly to renew the country's rolling-stock, which has been overworked during the last four years. A considerable increase in railway freight traffic is also to be faced. These conditions imply the construction of powerful traction units capable of hauling as heavy loads as possible at a speed closely approximating to the speed of passenger trains. Further, owing to the high cost of fuel, particular importance will attach to arrangements destined to reduce fuel consumption, by improving the utilization of the steam in the cylinders, or by improving the steam raising power of the boiler.

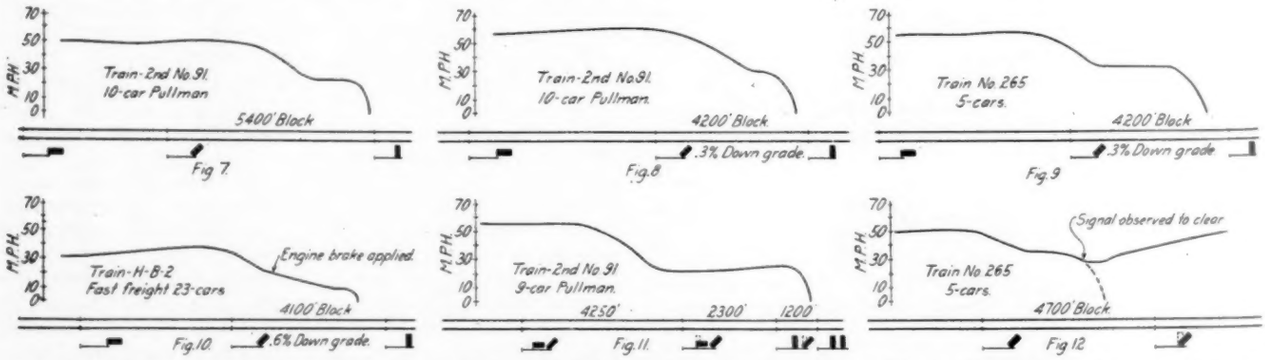


Fig. 7—Signal Stop from 50 M. P. H.
Fig. 10—Signal Stops from 40 M. P. H.

Fig. 8—Signal Stop from 60 M. P. H.
Fig. 11—Signal Stops from 55 M. P. H.

Fig. 9—Signal Stops from 56 M. P. H.
Fig. 12—Signal Slow Down

General News Department

President Wilson, on May 20, signed the Overman bill, authorizing him to reorganize executive departments and agencies, under which he is expected to transfer some of the forces of the Interstate Commerce Commission to the Railroad Administration or other agencies.

Employees of the Pennsylvania Railroad System in the military and naval service on April 1, last numbered 12,548; and 8,415 of the names of these men are printed in a statement, filling 42 pages, of the Mutual Magazine, published by the employees of the Pennsylvania Railroad. This number of the magazine (May) has for its frontispiece a full length portrait of Brigadier-General W. W. Atterbury.

The committee on track elevation of the Chicago city council, which conferred with the Railroad Administration at Washington last week to determine the latter's attitude towards a continuation of the track elevation program in Chicago, was referred to the regional director. If Mr. Aishton finds that any or all of the improvements which have been projected are vitally necessary, and so recommends to the director general, the completion of the work may be permitted.

Carrying workmen to industrial plants now requires, on the Pennsylvania Railroad, 370 passenger cars above normal passenger requirements on that road, these cars are mostly used between cities and nearby shipyards, munition factories, and other industries which have been established on account of the war; and the daily movement in each direction is from 31,000 to 32,500 passengers. Most of these industries are situated between New York and Baltimore. Every Saturday the Pennsylvania carries about 10,000 soldiers on furlough from Camp Dix, and Camp Meade to their homes, and carries them back to the camps on Sunday.

New union ticket offices are being established in many places. Locations in New York City, at 66 Broadway and at 280 Broadway, have already been announced. That for the "mid-town" district will be at 31 West Thirty-second street. A lease for this property has been taken for six years. The new union office at Louisville, Ky., has been opened in the Todd building, Fourth and Market streets. The agent is Frank L. Alexander, heretofore ticket agent of the Louisville & Nashville at the Tenth street station. The saving in rents at Louisville is estimated at $22,000. Nine roads participate in the use of this office. Arrangements for an office in Chicago are noted in another column.

H. P. Salter, freight agent of the Louisville & Nashville at Nashville, Tenn., has relieved the congestion in his freight houses on numerous occasions, recently, by employing squads of young men from the colleges. A group of 20 young men from George Peabody college for teachers, helped out recently by working Saturday afternoon and on Sunday, and similar assistance has been rendered by students from Vanderbilt University. The work of these helpers is reported as highly satisfactory. Thirty students of the University of Chicago have signed contracts to work as track laborers for the Chicago, Burlington & Quincy in Wyoming during the coming summer.

The Pennsylvania bridge over the Ohio at Louisville, Ky., the entrance of the Southwest System to the city of Louisville, was seriously damaged by fire on May 6. The bridge is undergoing reconstruction and the fire occured in the timber falsework and the counterweight forms in the south tower of the vertical lift span, which is over the Government canal on the Kentucky side of the river. Owing to the location of the initial blaze high up on the tower, difficulty was experienced in fighting the fire, which was not extinguished for several hours and did serious damage to the steel work of the tower. The amount of damage and the extent of the delay in completing the structure will not be known until a careful survey is made. The cause of the fire is not definitely known but is assumed to be a spark from a passing locomotive.

Great oaks from little acorns grow, and great losses from little causes flow; and the general manager of the Coast Lines of the Atchison, Topeka & Santa Fe uses a picture of an oak tree, issued in the shape of a circular printed in red, white and blue, to impress on the employees of the road, the causes which have led up to the payment by the company of $1,234,965 for losses of and damages to freight during the year 1917. The largest single item in the list of losses appears to be that for live stock, $138,359; and the next is lumber, $113,143. Among the big limbs of the tree lettered to show important causes of losses, are wrecks; improper refrigeration and ventilation; delays; dirty and defective cars, and concealed losses.

Labor difficulties in connection with the construction of the new Pennsylvania freight terminal at Chicago, were summarily terminated this week by the federal government. Several weeks ago, when the Quartermaster's Department of the Army reserved space in the new building it was found that the electricians who were putting in the wiring for the elevators were on a strike and that some other unions had gone out in sympathy. Despite the efforts of the government to induce the men to return to work the electricians remained obdurate. Finally, on Monday last, the government hired electricians belonging to an opposition union. United States troops have been placed on guard and it is expected that the wiring will now be completed in about six weeks.

The lines of pneumatic tubes in New York city, used for conveying letters underground between the central and the branch post offices aggregate in length about 27 miles, and the number of carriers transmitted through them daily is about 80,000. Each carrier has a capacity for about 450 ordinary letters, or 250 large letters. Each tube line consists of two tubes, each 8 in. in diameter. In the busy hours carriers are despatched every ten or fifteen seconds. These and other facts have been brought out in connection with the strenuous contest which has been made before committees of Congress in support of the clause in the annual appropriation bill providing for the maintenance of the tubes for the ensuing fiscal year. The postmaster general has persistently urged Congress to discontinue the use of the tubes and to have all letters carried by automobile trucks in the cities now using tubes—Boston, New York, Philadelphia, Chicago and St. Louis.

More State Railroading

The Massachusetts legislature has passed a bill providing for state control of the Boston Elevated Railway, which operates elevated, subway and surface lines in Boston and its suburbs. This law puts the management of the property, for a period of ten years, in the hands of five trustees to be named by the governor, provides for a guaranteed dividend of 6 per cent, and leaves the question of fares to be determined by the condition of the reserve fund.

Commercial Bribery

The Federal Trade Commission on May 16 sent to both branches of Congress a communication urging the enactment of a sufficient law striking at the unjustifiable and vicious practices of commercial bribery. The report says that the commission has found commercial bribery to be general throughout many branches of industry, and scores of complaints have been issued by it on that account. Fourteen states have laws prohibiting such practices, but they fail to reach the root of the evil. The commission can only deal with commercial bribery as an unfair method of competition, having no criminal jurisdiction.

REVENUES AND EXPENSES OF RAILWAYS

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Month of January, 1918															
Oahu Ry. & Land Co.	114	71,852	29,194	116,596	21,022	10,631	820	35,083	6,231	73,774	63.27	42,822	10,000	32,822	—1,159
Oregon Short Line	2,306	1,780,752	436,534	2,413,593	259,374	351,641	31,930	749,128	79,351	1,515,891	62.81	897,702	157,754	739,795	18,354
Oregon Washington R. R. & Nav. Co.	2,065	1,067,724	436,104	1,644,525	290,979	231,716	41,050	668,153	75,485	1,331,405	80.96	313,120	124,034	189,028	—83,934
Union Pacific	3,630	4,145,803	1,087,021	5,823,950	611,391	1,135,189	92,524	2,045,411	196,567	4,217,659	72.42	1,606,291	288,642	1,316,824	160,292
Month of February, 1918															
Beaumont, Sour Lake & Western	118	78,325	39,620	121,889	12,889	13,715	2,195	41,713	4,419	74,931	61.47	46,958	2,275	44,683	15,029
New Orleans, Texas & Mexico	191	122,609	39,613	165,484	21,878	30,413	3,269	54,106	5,611	115,277	108.52	50,207	4,175	46,016	12,542
Oahu Ry. & Land Co.	114	74,451	26,856	107,217	13,622	9,527	972	35,040	5,881	65,017	60.64	42,200	10,000	32,200	—4,342
St. Louis, San Francisco & Texas	143	108,935	8,862	122,932	17,204	22,281	2,447	45,567	7,355	94,854	77.97	28,078	1,648	26,244	15,430
Month of March, 1918															
Alabama Great Southern	312	470,068	161,720	679,476	44,860	142,083	12,936	237,411	14,759	455,725	67.07	223,751	21,066	202,598	77,962
Ariz. Eastern	377	312,031	51,341	387,944	71,143	52,395	2,750	82,852	15,317	230,125	.....	157,820	15,625	142,191	—30,352
Atlanta & West Point	93	89,441	67,072	175,878	18,449	28,721	3,894	61,324	5,120	120,047	68.26	55,831	7,600	48,231	14,326
Atlanta, Birmingham & Atlantic	639	290,498	53,437	373,204	75,242	77,931	10,884	175,337	13,586	353,032	94.59	20,173	15,700	4,451	—43,970
Baltimore & Ohio	4,948	9,295,584	1,847,170	12,007,286	1,590,982	3,143,693	163,965	5,609,516	327,734	10,907,471	90.84	1,099,815	419,099	678,420	—476,568
Baltimore, Chicago & Atlantic	87	69,581	32,486	101,812	6,216	13,806	1,000	58,055	3,076	82,153	80.69	19,659	2,377	17,282	2,985
Coal & Coke	197	82,601	19,508	105,800	22,285	32,861	1,422	50,296	3,357	110,221	.....	—4,421	5,000	—9,421	—14,473
Colo. Midland	337	125,883	12,911	145,169	32,810	22,520	6,977	104,415	4,616	171,990	.....	—26,821	6,864	—33,685	(*)
East St. Louis Connecting R. R.	3	.....	.....	86,615	10,316	13,923	306	59,904	3,819	88,268	101.91	—1,653	1,652	—3,305	—5,675
Fonda, Johnstown & Gloversville	88	24,786	61,147	89,231	8,384	7,954	454	30,366	6,399	53,558	60.02	35,673	4,500	31,173	—5,727
Great Northern	8,255	4,796,297	1,238,184	6,684,801	1,220,641	1,230,646	92,879	2,964,481	134,898	5,705,301	85.35	979,500	456,117	522,652	—602,905
Hocking Valley	349	745,880	73,145	855,525	93,947	263,122	7,507	323,399	19,533	706,981	82.64	148,544	49,850	98,629	—89,061
Kansas City Terminal	24	.....	.....	91,990	9,911	16,357	.....	45,994	934	73,273	.....	18,716	18,370	347	—16,569
Los Angeles & Salt Lake	1,164	763,865	276,642	1,120,748	151,916	187,542	31,531	414,391	22,692	828,947	73.96	291,801	62,052	229,730	—180,692
Louisiana Ry. & Nav. Co.	365	212,184	65,861	290,274	29,813	39,471	5,899	101,145	7,176	183,504	63.22	106,770	14,000	92,767	68,033
Missouri & North Arkansas	365	82,250	38,817	128,362	27,117	26,567	2,990	52,379	4,998	113,855	88.70	14,507	5,612	8,156	—13,692
Missouri, Kansas & Texas System	1,744	1,912,864	606,241	2,658,373	299,615	663,585	31,138	921,139	76,186	2,015,915	75.83	642,457	102,712	539,580	56,988
New Orleans & Northeastern	203	365,016	118,011	517,906	50,517	68,755	8,482	165,386	13,949	309,659	39.79	208,247	27,627	180,620	92,437
New Orleans Great Northern	284	133,709	36,872	178,735	20,899	30,160	4,250	59,945	6,697	122,229	68.39	56,507	8,257	48,248	23,586
New York, New Haven & Hartford	2,007	3,839,393	2,750,835	7,544,256	881,620	1,311,421	42,853	3,507,325	222,205	6,100,335	80.86	1,443,921	290,000	1,153,489	—494,002
New York, Philadelphia & Norfolk	121	385,274	95,139	518,174	47,422	130,134	9,534	235,609	10,007	443,505	85.58	74,669	14,044	60,625	43,759
New York, Susquehanna & Western	135	254,118	45,424	325,335	33,076	42,222	1,726	192,789	6,445	276,253	84.91	49,082	14,917	34,165	—23,726
Oregon Short Line	2,311	1,884,314	498,738	2,564,239	372,776	339,549	26,342	665,986	79,930	1,526,933	59.55	1,037,307	160,754	876,374	13,249
Ore.-Wash. & Nav. Co.	2,065	1,215,511	489,156	1,920,015	293,507	230,878	36,245	709,691	78,298	1,392,660	.....	527,355	123,946	403,316	90,174
Panhandle & Santa Fe	709	375,857	119,762	520,095	74,882	112,097	4,740	171,630	14,525	377,404	72.56	142,691	17,432	124,848	—87,420
Pitts. & Lake Erie	224	2,158,252	176,390	2,482,821	332,944	549,470	14,237	762,139	39,424	1,703,229	68.60	779,591	72,800	706,791	99,517
Pitts. & Shawmut	94	101,815	4,791	107,633	22,738	23,019	1,064	33,439	4,653	84,913	.....	22,720	3,847	18,873	—21,001
Pitts., Cin., Chic. & St. L.	2,398	4,851,321	1,433,857	6,926,656	824,640	1,645,108	82,197	2,844,363	158,493	5,164,771	74.56	1,311,886	229,228	1,082,334	—183,410
Pittsburgh & West Virginia	63	132,966	9,774	150,514	17,476	44,571	1,303	46,490	5,906	124,850	82.95	25,663	8,466	17,197	.....
Port Reading	21	169,304	.....	214,323	18,921	12,867	40	88,566	522	120,913	56.42	93,410	10,000	83,410	28,645
Rich., Fred. & Potomac	87	166,848	234,533	443,901	28,266	55,051	3,400	190,103	8,817	290,419	66.42	153,483	12,626	140,614	—11,495
Rutland	415	248,655	85,366	384,731	54,456	71,005	8,733	206,908	8,165	349,999	90.97	34,731	17,562	17,169	—53,793
St. Joseph & Grand Island	258	194,305	30,207	237,245	23,773	31,820	2,585	118,008	6,483	183,786	77.46	53,464	8,606	44,851	30,795
St. Louis, Brownsville & Mexico	548	188,592	91,005	308,027	44,857	32,187	9,383	96,768	11,385	194,581	63.17	113,446	9,944	103,233	—5,856
St. Louis-San Fran.	4,761	3,399,141	1,517,946	5,243,208	781,010	1,076,869	53,570	1,996,986	147,236	4,045,984	77.16	1,197,224	257,504	937,992	—238,484
St. L., San Fran. & Texas	143	102,454	9,177	121,874	11,783	17,462	1,319	48,935	6,429	85,928	70.51	35,946	1,752	34,136	17,074
St. Louis Southwestern	1,783	1,474,189	294,106	1,862,774	194,190	369,333	43,551	556,479	54,228	1,219,633	65.41	643,142	30,320	612,479	258,134
San Ant. & Aransas Pass	732	240,565	90,191	367,529	48,657	71,191	7,308	175,482	14,018	316,246	86.05	51,293	15,000	36,131	51,053
Seaboard	3,561	1,904,195	895,624	3,094,174	261,073	631,183	61,850	1,265,378	78,296	2,324,892	75.14	769,282	119,730	648,623	—136,512
South Buffalo Railway Co.	35	132,112	.....	302,501	32,131	48,182	1,499	182,111	4,687	268,610	89.80	33,891	4,200	29,691	—69,880
Southern	6,982	5,890,095	2,879,587	9,534,253	883,004	1,443,965	130,459	3,357,377	187,903	6,057,412	63.53	3,476,841	302,343	3,171,628	1,126,094
Sou. in Miss.	278	61,612	39,615	110,897	24,320	10,505	3,105	47,935	3,808	89,675	80.86	21,221	9,000	12,219	17,943
Southern Pacific	7,102	8,038,119	3,284,552	12,332,024	1,978,443	2,024,234	158,594	5,123,072	271,154	9,719,787	78.82	2,612,236	550,311	2,059,385	—1,014,849
Spokane International Ry. Co.	165	63,194	14,681	80,646	16,746	7,320	1,614	24,149	3,495	53,323	66.12	27,322	3,526	23,796	10,694
Spokane, Portland & Seattle	554	370,777	138,506	542,571	57,175	43,026	6,176	174,825	15,276	300,303	55.35	242,268	72,000	170,182	—26,159
St. Louis Merchants Bridge Terminal	9	.....	420	277,408	43,520	34,425	821	170,109	6,016	254,891	91.88	22,518	8,000	14,518	—28,446
Texarkana & Ft. Smith	81	91,647	13,491	113,311	10,537	6,846	3,480	35,888	4,756	61,196	54.01	52,116	9,152	42,964	5,971
Texas & New Orleans	469	400,967	149,343	600,136	116,651	58,681	8,023	210,386	12,104	421,348	70.21	178,789	19,500	159,101	241,696

* Began operations June 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1918, CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Tex. & Pacific	1,947	1,341,613	522,463	2,005,034	223,974	323,198	31,311	808,210	75,324	1,476,627	73.65	528,407	86,936	440,987	64,291
Toledo & Ohio Cent	435	665,798	44,780	736,606	117,368	177,782	6,625	360,842	10,611	615,055	83.50	121,551	28,709	92,842	24,997
Toledo, St. L. & West	454	605,961	21,057	650,966	82,247	97,209	13,646	241,977	10,517	445,598	68.45	205,367	19,000	186,367	72,991
Trinity & Brazos Valley	368	72,058	12,803	89,074	18,881	29,781	1,776	49,187	8,496	108,322	121.61	—19,248	6,580	—25,828	17,825
Union R. R. of Balto	8	112,175	64,516	178,987	10,831	.....	.....	10,643	2,926	24,400	13.63	154,587	8,429	146,157	—5,069
Union R. R. of Penna	35	.....	.....	423,871	39,697	184,221	408	278,313	6,253	508,882	120.06	—85,012	5,180	—90,192	—44,192
Utah Ry.	100	90,259	505	91,248	7,694	8,505	150	18,860	7,904	43,113	47.25	48,134	3,417	44,716	.....
Vicks., Shreveport & Pacific	171	137,039	59,691	219,904	22,248	38,617	5,841	63,133	6,292	140,433	63.86	79,472	9,000	70,472	21,200
Virginian	518	708,307	47,094	816,914	90,586	167,342	5,422	348,669	15,419	629,492	77.06	187,422	41,245	146,164	—189,835
Wabash	2,519	2,682,174	667,515	3,623,136	328,652	618,569	66,066	1,656,285	82,720	2,779,764	76.47	852,372	110,786	741,416	—204,803
Wash. Sou.	35	49,385	147,471	250,318	17,339	28,431	1,355	97,290	4,334	150,769	60.23	99,549	5,434	94,115	7,484
Western Pacific	1,907	649,481	79,428	772,287	150,799	93,251	18,004	262,133	20,667	554,436	71.79	217,851	40,923	176,912	—76,373
Wheeling & Lake Erie	512	768,512	33,729	868,476	134,053	185,292	7,185	340,625	24,573	693,042	79.80	172,433	48,700	123,414	—48,947
Yazoo & Mississippi Valley	1,382	1,431,286	362,590	1,863,666	207,217	324,060	15,770	588,945	39,989	1,177,682	64.19	685,984	61,528	624,412	345,918
TWO MONTHS OF CALENDAR YEAR, 1918															
Atch., Top. & Santa Fe	8,641	14,243,736	5,366,586	21,375,028	2,735,284	4,219,143	331,456	8,063,595	465,540	15,840,140	74.11	5,534,887	1,114,791	4,418,632	—2,503,824
Balto. & Ohio	4,948	11,362,627	3,266,306	16,507,956	2,619,770	5,431,070	364,056	10,690,483	567,552	19,809,434	120.00	—3,301,479	801,762	—4,108,736	—7,878,081
Beaumont, Sour Lake & Western	118	174,124	62,802	245,049	26,925	28,411	4,738	81,043	7,405	148,524	60.61	96,525	4,300	92,220	28,474
Cumberland Valley	163	436,393	106,483	592,186	60,599	85,873	9,701	263,243	21,481	442,438	74.84	149,748	17,078	132,670	—115,898
El Paso & Southwestern	1,028	1,912,550	425,684	2,448,256	208,981	320,306	40,146	691,294	64,263	1,338,831	54.69	1,109,425	101,971	1,007,435	—135,545
Fla. East Coast	764	737,653	613,948	1,584,141	142,892	184,583	38,714	499,226	34,767	879,737	55.53	704,404	75,497	628,620	—234,284
Ft. Worth & Rio Grande	235	128,570	54,957	197,228	38,486	42,695	3,238	81,289	9,539	175,247	88.86	21,981	6,052	15,565	20,330
Grand Rapids & Ind	569	525,342	194,699	800,642	153,749	194,169	18,936	452,654	35,938	856,112	106.93	—55,470	45,859	—101,586	155,969
Gulf, Colo. & Santa Fe	1,937	2,096,238	758,680	3,041,274	514,293	480,864	52,804	1,009,814	109,062	2,162,438	71.10	878,836	138,386	739,146	173,089
Ill. Cent.	4,765	9,661,448	2,794,997	13,543,527	2,427,652	3,122,814	176,721	6,009,718	375,228	12,167,673	89.84	1,375,853	769,224	600,242	—2,203,080
Kans. City Sou	774	1,780,870	321,551	2,264,434	187,218	359,387	46,310	841,139	70,962	1,503,666	66.40	760,768	113,972	646,409	—5,259
Lehigh Valley	1,446	5,166,610	639,050	6,453,778	926,405	1,876,843	142,770	4,491,646	183,548	7,642,036	118.41	—1,188,258	322,941	—1,511,497	—1,933,377
Newburgh & South Shore R. R. Co	15	.....	7	105,054	15,843	43,470	.....	80,950	7,813	148,076	140.95	—43,022	8,675	—51,697	—26,419
New Orleans, Texas & Mexico	191	255,234	76,595	338,966	43,706	62,843	7,207	109,679	12,382	235,815	69.57	103,151	6,100	96,727	35,030
Oahu Railway & Land Co	114	146,303	56,050	223,813	34,644	20,158	1,792	70,123	12,111	138,792	62.01	85,022	20,000	65,022	—5,502
Ore. Short Line	2,306	3,227,928	860,780	4,456,296	561,171	674,865	60,744	1,418,629	160,429	2,958,542	66.39	1,497,754	315,508	1,181,932	15,167
Ore.-Wash. R. R. & Nav. Co	2,065	1,962,340	872,416	3,134,394	627,341	451,979	78,431	1,307,889	157,113	2,685,531	85.68	450,863	247,788	202,928	—274,506
Panhandle & Santa Fe	709	661,799	187,776	896,145	114,466	206,649	8,606	315,999	27,390	671,257	74.90	225,888	34,864	191,024	—168,856
Penn. Co.	1,754	5,838,038	1,827,573	8,783,254	1,916,505	2,732,369	165,896	5,670,233	329,894	10,903,697	124.14	—2,120,444	570,288	—2,690,807	2,378,753
Pitts., Cin., Chgo. & St. Louis	2,398	6,318,513	2,026,087	9,384,726	1,580,505	2,746,550	184,477	5,274,200	290,961	10,181,266	108.49	—796,540	458,782	—1,255,619	2,495,524
Pitts., Shawmut & Northern	204	213,066	11,935	229,612	37,322	88,248	2,385	146,807	13,664	287,826	125.35	—58,214	3,595	—61,809	—59,206
St. L., San Francisco & Tex	143	223,523	32,396	267,390	29,146	44,135	3,928	96,753	11,424	185,387	69.33	82,004	3,285	78,533	58,753
St. Louis, San Francisco & Texas	143	223,523	32,396	267,390	29,146	44,135	3,928	96,753	11,424	185,387	69.33	82,004	3,285	78,533	19,780
Union Pac.	3,630	8,038,317	2,141,240	11,347,254	1,314,705	2,170,603	177,828	3,925,142	385,566	8,256,490	72.76	3,090,764	577,284	2,512,501	424,238
Yazoo Miss. Valley	1,381	2,161,984	713,203	3,024,464	430,665	588,359	36,587	1,114,805	82,089	2,252,925	74.49	771,539	123,056	648,073	—29,151
THREE MONTHS OF CALENDAR YEAR, 1918															
Alabama Great Southern	312	1,177,372	481,849	1,785,865	140,561	405,073	39,382	671,739	39,692	1,305,659	73.12	480,206	62,444	417,577	50,383
Alabama Vicksburg	141	338,948	140,265	537,486	46,764	104,120	16,313	222,813	20,901	413,987	77.01	123,559	31,500	92,059	—17,603
Ann Arbor	293	531,668	102,798	686,301	99,005	137,136	15,589	366,502	26,407	646,590	94.22	39,711	39,400	394	—29,659
Ariz. Eastern	377	877,294	145,965	1,097,620	179,998	135,925	7,866	244,015	46,009	630,238	.....	467,393	51,166	416,094	—155,694
Atch., Top. & Santa Fe	8,641	22,889,190	8,176,029	33,770,128	4,281,125	6,523,849	512,274	12,231,203	714,098	24,238,964	71.78	9,531,163	1,671,672	7,857,103	—3,405,422
Atlanta, Birmingham & Atlantic	639	805,977	162,333	1,049,790	204,023	223,214	32,636	495,407	36,853	992,311	94.52	57,479	47,100	10,279	—134,773
Atlanta & West Point	93	247,763	199,508	507,658	54,042	84,946	11,720	182,300	14,992	356,238	70.17	151,420	22,800	128,620	34,121
Atlantic & St. Lawrence	166	376,572	59,131	471,927	59,039	131,760	10,556	473,542	17,897	682,795	144.68	—210,868	34,038	—244,906	—151,944
Atlantic City	170	260,582	243,367	538,864	85,751	113,565	5,073	356,447	5,167	566,275	105.09	—27,412	36,000	—63,412	—19,800
Atlantic Coast Line	4,785	8,434,078	3,907,954	13,261,685	1,299,453	2,044,142	179,387	5,043,185	278,021	8,907,760	67.27	4,353,925	480,000	3,872,371	—282,262
Baltimore, Chicago & Atlantic	87	98,452	41,699	143,569	18,073	38,018	3,674	125,768	7,970	193,502	134.78	—49,932	7,131	—57,063	42,698
Balto. & Ohio Chic. Terminal	79	.....	1,283	323,931	96,328	113,802	2,846	291,217	29,880	539,275	166.48	—215,344	74,151	289,497	—179,903
Baltimore & Ohio	4,948	20,658,211	5,113,476	28,515,242	4,210,752	8,574,764	528,021	16,299,999	895,286	30,716,906	107.72	—2,201,664	1,220,861	—3,430,315	—8,354,649
Bangor & Aroostock	632	822,598	180,272	1,051,801	195,628	200,537	10,321	471,511	34,517	924,915	87.94	126,886	53,205	73,659	—284,267
Beaumont Sour Lake & West	118	277,157	97,343	386,947	40,127	42,796	7,020	124,834	12,003	226,780	58.61	160,166	6,450	153,679	73,567
Belt Ry. Co. of Chic	31	.....	.....	769,152	99,441	155,637	1,373	515,189	23,702	795,343	103.41	—26,191	40,938	—67,129	—191,976
Bessemer & Lake Erie	208	1,504,877	88,853	1,670,517	273,653	751,669	29,795	864,012	65,945	1,879,746	112.52	—209,229	62,666	—271,900	—337,708
Bingham & Garfield	36	695,526	13,257	726,552	106,265	121,484	4,395	143,863	11,618	397,743	54.74	328,809	28,696	300,114	—75,509
Birmingham Sou.	44	274,978	4,037	345,809	41,377	89,907	2,744	177,133	11,908	383,068	110.77	—22,741	10,838	11,902	—11,514
Coal & Coke	197	221,103	57,778	293,455	55,994	96,176	4,206	149,418	11,100	316,895	.....	—23,440	15,000	—38,440	—63,448
Colo. Midland	337	333,381	37,949	392,597	74,814	73,547	20,613	276,141	14,415	461,768	.....	—69,170	20,592	—89,763	(*)
East St. Louis Connecting R. R.	3	.....	.....	223,690	30,478	30,897	986	187,047	11,175	260,582	116.50	—36,892	4,956	—41,851	—62,391

* Began operations June 1, 1917.

Western Railway Club

At the annual meeting of the Western Railway Club held at the Hotel Sherman, Chicago, on May 20, the following officers were elected: President, A. LaMar, master mechanic, Pennsylvania Lines; first vice-presidents, G. S. Goodwin, mechanical engineer, Chicago, Rock Island & Pacific; second vice-president, W. Alexander, superintendent of motive power, Chicago, Milwaukee & St. Paul; treasurer, C. H. Bilty, mechanical engineer, Chicago, Milwaukee & St. Paul.

Manganese Track Society Elects Officers

The Manganese Track Society met at the Hotel Blackstone, Chicago, on May 16, and elected officers for the coming year. Knox Taylor, president of the Taylor-Wharton Iron & Steel Company, Easton, Pa., was elected chairman, succeeding A. H. Mulliken, president of the Pettibone-Mulliken Company, Chicago. O. de G. Vanderbilt, president of the Weir Frog Company, Cincinnati, Ohio, was elected vice-chairman in place of R. W. Gillespie, of the Bethlehem Steel Company, South Bethlehem, Pa., and Henry Elliot, president of the Elliot Frog and Switch Company, East St. Louis, Ill., becomes treasurer in place of R. J. Davidson, treasurer of the Ramapo Iron Works, Hillburn, N. Y. B. M. Fosgate, Chicago, continues as secretary.

Convention of American Association of Engineers

At the national convention of the American Association of Engineers at Chicago on May 14, the following officers were elected for the coming year: President, W. H. Finley, chief engineer, Chicago & North Western, Chicago; first vice-president, W. H. Clausen, assistant city engineer of Chicago; second vice-president, L. K. Sherman, president of the L. K. Sherman Engineering Company, Chicago; national directors to serve two years; Harold Almert, consulting engineer, Chicago; F. K. Bennett, principal assistant engineer, Minneapolis & St. Louis, Minneapolis, Minn.; T. M. Chapman, civil engineer, Central of Georgia, Atlanta, Ga.; J. N. Hatch, consulting engineer, Chicago; Alexander Potter, consulting engineer, New York; J. H. Prior, consulting engineer, Chicago.

The Airplane Mail Service

The airplanes of the Post Office Department, carrying letters between New York and Washington, have finished their first week with a checkered record. On the first day, Wednesday, May 15, the northbound flyer broke down at a point in Maryland about 25 miles from Washington, and his letters, at first reported as having been transferred to railroad cars, were brought to New York by airplane on the next day. The southbound trip on Wednesday, with 350 lb. of mail, was made substantially according to the schedule.

On Thursday the northbound trip was made successfully, leaving Washington at 11.30 A. M., and reaching the landing ground at New York at 2.58 P. M. On this trip the amount of mail was 118 lb., only 5 lb. of which was mailed at Philadelphia. The southbound aviator on Thursday lost his way and landed at Bridgeton, N. J. He reached Philadelphia by automobile at 5.15 P. M. The Philadelphia-Washington machine then started for Washington, but went only 25 miles before something failed. A new start was made, however, and the mail finally reached Washington at 8.45 P. M.

On Friday a start was made from Washington at 11 A. M., but it was necessary to make stops for repairs, and Philadelphia was not reached until 7.25 P. M. The mail was taken to New York by train. The flyer who was waiting at Philadelphia, seems to have started for New York on time and arrived at 3.48 with 4⅛ lb. of mail. The southbound trip on Friday was made on time.

On Saturday, the fourth day, both northbound and southbound trips were successful, the time from Philadelphia to New York being 67 minutes, and from New York to Philadelphia 65 minutes. On Monday, the fifth day, the records appear to have been all right in both directions, the amount of mail leaving New York being 125 lb., and that arriving in New York 35 lb. From Philadelphia to Washington the trip of 135 miles was made in 89 minutes, favorable winds having helped the motor. On Tuesday, the sixth day, an electrical storm appears to have prevented the flyer from starting from Philadelphia for New York. Southbound on Tuesday the flyer left New York on time, but soon encountered an electrical storm and returned; and the mail was sent by railroad. From Philadelphia to Washington the flyer also encountered an electrical storm—at a height of about two miles—but he kept on, and reached Washington in 154 minutes from Philadelphia.

The Government Railroad in Alaska

William C. Edes, chairman of the Alaskan Engineering Commission, says that this line will not be finished before 1921, or considerably later than the date calculated when the work of building the road was begun. The line is now 65 per cent completed, but more time may be required to build the unfinished third than was required for the completed two-thirds. About 6,000 men were employed in the field last year, but the chairman expects that not more than 3,000 men can be obtained this year. The Commission will direct its chief efforts to completing the main line between Seward and Anchorage and to laying steel toward Fairbanks. It is hoped to open the line from Mile 215 to Mile 265. For the transportation of supplies from the States to Seward and Anchorage, dependence must be placed, this season, on the commercial steamship lines. The amount of these supplies for this season is estimated at 5,000 tons, which will tax the capacities of the vessels. The government has spent thus far on this railroad an aggregate of $23,670,000. The original estimate of the cost of the road was $35,000,000, but, on account of the increased cost of labor and materials, the present estimate is $40,000,000.

In the Anchorage district last year a large crop of potatoes was raised, and the coal fields yielded 54,000 tons of coal.

Accident Bulletin No. 63

The Interstate Commerce Commission has issued Accident Bulletin No. 63, giving statistics of railroad accidents occurring in the United States during the three months ending with March, 1917. This bulletin appears to have been made up in November, 1917, about seven months after the close of the period for which it gives returns; but it reached this office on May 17, 1918, or about 13 months late. (The last bulletin, No. 62, was reported in the *Railway Age* of September 14, 1917, page 462.)

The present bulletin is printed on sheets 9 in. x 11 in., and its form and style are changed throughout; and it contains much less detail than has been given heretofore. At the end of the year, however, it is proposed to give more detail, rather than less; this quarterly bulletin is being issued in abbreviated form so as to present "certain accident figures of immediate interest and usefulness." The electric railway statistics are left out; casualties to trespassers are given for each state in the Union separately; train accidents are shown in a table (giving the statement for each month by itself), in which the number of accidents is compared with the number of millions of locomotive miles; and the number of casualties to shopmen and other workmen is shown compared with the number of hours worked by the men, in each class, during the months reported. An appendix of 19 pages gives the circumstances and causes of train accidents which were investigated by the Bureau of Safety, of the commission, during the three months under review.

The total number of persons killed and injured on the railroads of the United States during the quarter here reviewed was 51,426; that is to say, 2,346 killed, and 49,080 injured. The condensed totals of the tables of casualties are as follows:

Casualties on Steam Railroads, Three Months Ending with March, 1917

	Passengers		Employees		Other persons	
	Killed	Injured	Killed	Injured	Killed	Injured
In train accidents.....	38	840	114	1,187	47	181
In train service accidents	43	866	614	12,565	1,357	1,888
In industrial accidents.. ..	...		114	30,992	19	561
Totals	81	1,706	842	44,744	1,423	2,630

The number of "other persons" killed in train accidents (47) is swelled by including, under the head of train accidents, cases where a train strikes an automobile, or other vehicle at a public highway crossing. There were 38 accidents of this kind, in which 25 non-trespassers were killed, and 143 injured. The damage to railway property in these 38 accidents is given as $16,790.

The number of collisions per million locomotive miles in three months was 3.48, and of derailments 5.05. The total damage to railway property in all train accidents was $3,078,370. The man-hours of shopmen reported by all the roads in class 1, were, for the quarter, 317,760,570, and the number of casualties per million man-hours, in and around shops, was 50.68. In this statement of ratio the killed, 34, and the injured, 17,714, are lumped in a single item. Similar statements of ratios are given for station men, trackmen, bridge and building men, and "other employees." The total number of casualties under the head of industrial accidents, as shown in the table above, was 31,686.

In our table the column headed "Other Persons," includes both trespassers and non-trespassers; and included in the trespassers are 39 *employees* killed and 63 employees injured. Besides these items there are included under the head of "Employees," 35 killed and 137 injured, who were not on duty.

Serious Delays to Trains by Heavy Mails

The report which has been sent to Congress and the President by the Merchants' Association of New York City concerning inefficient mail service, which report was briefly noticed last week, cites a great number and variety of statements showing how the movement of important postal trains has been seriously delayed by the conditions imposed by the Post Office Department as to the loading and unloading of mail at important stations. In the case of one of the heaviest mail routes the average train delay due to mails, during a period of thirty days, was 50.36 per cent of the total train delays. For 462 trains operating on 26 lines during the same period the general average of delay due to mails was 13.89 per cent. The Post Office Department explained the delays as due to the congestion of the railroad system, quoting the record of November, 1917, when there were 86,712 failures of mail trains to make their scheduled connections. The Merchants' Association calls attention to the omission of essential facts which, when shown, destroy the implication that delayed train movement is the sole, or even the principal factor in causing mail delays. By far the larger part of the mail trains operated in the month of November were substantially on time. Of all those not on time, a material part of the delay was caused by the conditions under which the railroads were required by the department to handle the mails. The number of train failures, 86,712, as stated by the department, is equivalent to only 18 per cent of the number of mail trains running. As each delayed train represents several missed connections, the number of such misses is obviously greater than the number of delayed trains causing them. The obligation rests with the Post Office Department to explain the major cause for the serious delays to the mails which, in number and duration of time, far exceed any possible delays that can result from raiload operation. Delays of one to four days were found to be not only common, but usual, in the case of mails moving not over 150 miles, by direct routes requiring no change to other lines, and upon lines having frequent train service. It is impossible convincingly to explain such delays by attributing them to delayed trains.

Trains Nos. 45 and 11, operating between New York and Pittsburgh, are among the main channels for the movement of west and eastbound mails. The record of delays to these trains caused by mails is as follows:

No. 45. October, 37.81 per cent November, 42.80 per cent
No. 11, October, 45.48 per cent November, 38.78 per cent

An examination of the daily records of these trains makes clear the fact that the delays due to the mails are in many cases sufficient to cause the train to miss its connections, and thereby prevent prompt despatch over connecting lines.

On the New York Central train No. 35, leaving New York at 8:40 p. m., is a solid mail train, carrying mails to make close connection with the Burlington at Chicago for far western points. A mail train from Boston connects with train No. 35 at Albany. The Boston train carries storage cars usually filled to capacity with mails. Under former practice these storage cars were switched into Train 35 at Albany and no delay in train movement was caused. Under the prevailing space system the cars coming from Boston end their run at Albany, and the mail contained in them is handled across the platform and loaded into Train 35. This process usually consumes considerable time. In one instance it required twenty-eight minutes in excess of the scheduled stop at Albany to transfer these Boston mails. Similar delays occur at other points, particularly at Cleveland, where heavy mails from Pennsylvania require to be transferred. At Toledo a large quantity of mail for Detroit must be unloaded.

The Boston mail taken on at Albany is not concentrated in a particular car upon Train 35. Every car upon that train is frequently so filled with mail originating at New York that there is not sufficient space in any one car to take the Boston mails. Consequently, the latter are distributed at Albany throughout several cars, and it is impracticable for the clerks upon the train to so assemble that mail as to permit its being properly worked before arrival at Chicago. Moreover, the postal crews, immediately after leaving Albany, are compelled to devote a large part of their time to readjusting the contents of the several cars, upon which a load of Boston mail has been dumped, in such manner as to enable them to get at the various mails which must be worked for points beyond Albany. This delay consumes the time of the crew, at least as far as Utica, so that much mail destined for intermediate points is carried by, because it has been made inaccessible by the overloading of the cars with the Boston mail.

Joint Meeting of Master Car Builders' and Master Mechanics' Association at Chicago, June 19-20

The Master Car Builders' Association and the American Railway Master Mechanics' Association have issued a joint circular postponing the annual conventions of the associations another year, and calling a meeting to dispose of the accumulated work of committees and to pass on other matters requiring action. All representative members, the chairmen of all committees, the executive committees of both associations, and the arbitration committee of the Master Car Builders' Association are invited to attend the meeting, which will be held in the Florentine Room of the Congress Hotel, Chicago, on June 19 and 20, 1918.

The Master Car Builders' Association will receive reports from the committees on the following subjects: Arbitration; standards and recommended practice; brake shoe and brake beam equipment; couplers; loading rules; car wheels; specifications and tests for materials; train lighting and equipment; tank cars, and welding truck side frames, bolsters and archbars.

Committees of the Master Mechanics' Association will present reports on the following subjects: Standards and recommended practice; mechanical stokers; fuel economy and smoke prevention; specifications and tests for materials; train resistance and tonnage rating; springs (shop manufacture and repair).

The reports of the committees will not be sent out to the members in advance of the meeting but copies will be distributed to those attending. Members will be free to discuss the papers as was customary at the annual conventions. The associations will maintain headquarters during the meeting at the Congress Hotel. There will be no exhibit of appliances in connection with the meeting.

A Smoke Kit for Every Rock Island Soldier

The Rock Island Lines plan to send a "smoke kit" to each of the 2,074 Rock Island men now in army and navy service. Ever since last summer money has been coming in for Company B, of the Thirteenth Engineers (Railways), which has been in France since early last fall. So far about $2,200 worth of "smokes" and other articles of comfort have been sent to the men in this company and, in addition, $2,275 has been cabled to the company as a mess fund. It is now proposed to send a kit containing tobacco, candy and other comforts to all other Rock Island men now with the colors. The May shipment to Company B cost $461 and consisted of 12,000 Fatima cigarettes, 720 packages of Tuxedo tobacco, 864 packages of Prince Albert, 100 books of cigarette paper, 1,440 pieces of chewing tobacco, 10 dozen packages of pipe cleaners;, 3,132 cigars, 180 lb. candy, 6,000 envelopes and 18,000 sheets of letter paper.

Terminal Engineers

The Society of Terminal Engineers at its annual meeting held in New York on May 21 elected as president for the ensuing year Gen. William H. Bixby, U. S. A., St. Louis, Mo. There were also elected five vice-presidents: Francis Lee Stuart, New York; B. F. Cresson, Jr., New York; John Meigs, Philadelphia, Pa.; Calvin Tomkins, New York, and Charles Whiting Baker, New York. The treasurer is W. Joshua Barney and the secretary J. H. Leonard, New York.

Traffic News

The safe transportation of eggs is the subject of a report, entitled "Bulletin No. 664," which has been issued by the Department of Agriculture, giving the results of an investigation of the conditions surrounding the transportation of 147 shipments of eggs, all of them full carloads, and also less complete examinations of many other shipments. The report fills 31 pages, and goes into extreme detail, millions of eggs having been inspected individually. The average haul was over 1,200 miles, and the observers visited 32 packing houses, the stations of 32 railroads, and the establishments of 33 consignees. The conclusions are summarized in the statement that when eggs are shipped in carload lots, packed in good, well-made, standard cases, with new medium or heavier fillers and flats, with properly placed and suitable cushions at top and bottom, with cases tightly stowed and efficiently braced in the car, and the car handled in accordance with good railroad practice, especially when switching, the total damage referable to transit was less than 2 per cent. When loads are buffed properly with straw at the ends of the car, the eggs are damaged near the center of the car more than at the ends. The load of eggs must be a solid unit in the car, fitting without play. Straw buffing at the ends too near the bottom, or the use of too much buffing, will waste half the refrigeration.

Coal Production

The continuation of favorable operating conditions, both of transportation and mining, during the week of May 11, are reflected in the production of coal, which gained 2.2 per cent over the week of May 4, and exceeded slightly the record week of April 27, according to the weekly report of the Geological Survey. The total production for the week is estimated at 11,806,000 net tons, an average per day of 1,968,000 tons, compared with 1,926,000 tons the first week of May and 1,829,000 tons in May, 1917. Anthracite shipments declined from 40,570 carloads during the week ended May 4 to 38,314 carloads during the week of May 11. The percentage of full time output lost during the week ended May 4 on account of car shortage was 13.1.

Centralized Ticket Offices at Chicago

A central ticket office for all railroads entering Chicago will be established in the Insurance Exchange building, on Jackson Boulevard, between Sherman and Wells streets. The entire first floor of the building, embracing 20,000 sq. ft., has been leased for this purpose by the regional director of railroads, according to P. S. Eustis, chairman of the passenger traffic committee of western railroads. This consolidation will mean a saving to the Railroad Administration of approximately $200,000 a year in rents and salaries. Comparatively few men will be thrown out of employment as most roads are now operating with restricted clerical staffs. The space will be divided into two sections, one on the east side of the building for the 14 eastern and southern roads and the other on the west side for the eight western lines. The arrangement of the booths to be occupied by the individual lines within the two sections has not yet been determined. The present tenants have been notified to vacate at once. Extensive alterations are to be made and the new ticket office will not be opened for several weeks. The quarters now occupied by railroad ticket offices will be sub-leased by E. A. Howard, vice-president of the Chicago, Burlington & Quincy.

PENNSYLVANIA OFFERS FRANCE TREES.—The Pennsylvania Department of Forestry, through Governor Brumbaugh, has offered to the French Government a gift of 4,000,000 forest tree seedlings from the State forest nurseries to be used in reforesting the shelltorn woods in the battlegrounds of eastern France. The tender will be made by Colonel Henry S. Graves, who organized the work of the forest regiments in France.

Commission and Court News

Interstate Commerce Commission

Collection of Undercharges

The commission has issued a revised interpretation of conference ruling 314. The commission held it to be the duty of common carriers to exhaust their legal remedies to collect undercharges; but carriers are advised that this ruling does not require the filing of a suit where the party liable for the undercharge cannot be located, or service cannot be made, or where upon investigation by the carrier in good faith it is found that legal process would be futile and ineffectual.

Court News

Railroad's Agreement with Customs Broker

The Michigan Supreme Court holds that an agreement between a railroad and its chief clerk, at a point on the Canadian line, that the clerk should remit to the railroad whatever fees he received as customs broker for the United States, was not *ultra vires* of the railroad.—Duluth S. S. & A. (Mich.), 167 N. W., 55. Decided March 27, 1918.

Removal of Station

In a hearing before the Oklahoma Corporation Commission, involving the removal of a station from one location to another, which it was alleged would be more convenient for the inhabitants of a nearby village, the probable cost to the company of removing the station and the facilities connected therewith came into question. Qualified witnesses on behalf of the railroad testified that the removal would cost in the neighborhood of $24,000. Without any witnesses testifying to the contrary, the commission found that, "from viewing the grounds and general knowledge of the right of way and structure," the estimate of the railroad was about twice the actual cost. The Oklahoma Supreme Court holds that this finding was not supported by the evidence. The order directing the removal was held unreasonable and unjust and was set aside. The present location of the station is about half a mile from the principal street of Red Rock, a town of about 600 inhabitants, and the petitioners wished it moved nearer the town.—Atchison, T. & S. F. v. Wolverton (Okla.), 171 Pac., 722. Decided March 12, 1918.

War Exigencies Must Be Proved

In the case of the Norfolk & Western against the Public Service Commission of West Virginia, in which the railroad appealed from an order of the commission requiring shipping facilities to be furnished for the Trace Coal Company, the Supreme Court of that state holds:

1. The Act of Congress conferring upon the Interstate Commerce Commission authority to require railroads to provide shipping facilities for shippers tendering interstate shipments sufficient to justify the construction and maintenance of the same, does not deprive the Public Service Commission of jurisdiction to require such a railroad to provide such facilities to a shipper offering intrastate commerce, even though the facilities, when provided, may be used in the shipment of interstate as well as intrastate commerce.
2. Findings of fact by the Public Service Commission based upon evidence to support them will not be reviewed by this court.
3. A common carrier will not be excused from its duty of furnishing shipping facilities to one offering commerce to it, upon the ground that all of its energies are required to meet government needs, brought about by the present state of war, where it does not appear that the granting of such facilities would divert any of the carrier's energies, or require of it service which would make it less able to perform its public duty.

Equipment and Supplies

The Government Locomotive and Car Orders

The mechanical committee and the purchasing committee of the Railroad Administration completed their joint meetings to discuss the question of specialties for the government cars and locomotives last Thursday. Since then long lines of representatives of specialty manufacturers have waited outside the doors of the purchasing committee and they have been called in for conferences from time to time. It is understood that most of the locomotive specialties have been determined, and some of the car specialties, but no announcements have yet been made.

Locomotives

THE BINGHAM & GARFIELD has ordered one 0-8-8-0 Mallet type locomotive.

THE FRENCH STATE RAILWAYS, and the Paris-Orleans Railway, it is reported, are inquiring in this country for locomotives.

THE CHINESE GOVERNMENT RAILWAYS, and the Yunnan Railway of China, it is reported, are inquiring in this country for locomotives.

Freight Cars

THE GUANTANAMO & WESTERN is inquiring for 25 box cars.

GIOVANNI ANSALDO & CO., Genoa, Italy, is inquiring for 10 40-ton general service cars.

THE UNITED STATES GOVERNMENT, ORDNANCE DEPARTMENT, has ordered 150 ammunition cars from the American Car & Foundry Company.

Passenger Cars

THE GUANTANAMO & WESTERN is inquiring for 3 to 5 passenger cars.

THE RAILWAY EXECUTIVE COMMITTEE OF ENGLAND recently issued a notice ordering that all cars containing coal consigned to stations and sidings adjoining docks and canals must be unloaded at the place to which they are consigned, and that they must not be re-labelled and consigned elsewhere.—*The Engineer, London.*

AERIAL SERVICE IN NORWAY.—The Tidens Tegn of Christiania states that a large number of prominent business men from all parts of Norway have decided to issue a prospectus relative to the organization and promotion of a company to be known as A/S Norsk Luftfartrederi. The purpose of the new company is to be that of maintaining regular aerial routes, partly between points in Norway, and partly between Norwegian and foreign points. The organizers held a meeting at Christiania on March 1, 1918, and the prospectus probably will be ready for distribution within a short time.—*Commerce Reports.*

GERMANY SELLS LOCOMOTIVES.—Despite the alleged deficiencies of the German railways in respect to rolling stock, Germany still finds it possible to manufacture locomotives for export according to an Associated Press Correspondent at Stockholm in a report dated March 25, and quoted in the New York Times. Two of an order of twenty for the Swedish State railways were received the first week in March, and the other eighteen were promised before April 1. The scarcity of brass and copper in Germany is evidenced by the fact that nearly all locomotive parts usually made of these metals are made of iron or steel in the locomotives already received. The Swedish State railways have also closed a contract with the German steel trust for 80,000 tons of rails, with plates and bolts. One-third of the order is to be delivered this year, a third in 1919, and the rest in 1920.

Supply Trade News

The Burden Sales Company, Inc., New York, announces the removal of its office from 30 Church street to the Forty-second street building, 30 East 42nd street.

Patrick T. Kilgarriff, chief clerk to T. C. Powell, vice-president of the Southern Railway system, Cincinnati, Ohio, has been elected vice-president of the Certes Supply Company, St. Louis, Mo.

Thomas Finigan was elected a vice-president of the American Brake Shoe & Foundry Company, with headquarters at Chicago, at a meeting of the board of directors of that company on May 20.

William F. Cutler has been elected president of the Southern Wheel Company, with headquarters at St. Louis, succeeding **W. G. Pearce** who now becomes chairman of the board of directors; and **Frank C. Turner** was elected vice-president in charge of sales with office at St. Louis.

Holmes Forsyth, second vice-president, secretary and general manager of the Curtain Supply Company, Chicago, was elected president at a meeting of the directors on April 30. Mr. Forsyth has been actively connected with the Curtain Supply Company since its organization in 1899, having at that time been elected second vice-president and secretary of the company, which offices he continued to hold until his recent election as president, succeeding **Edward T. Burrowes,** who died on March 19, at his home in Portland, Me.

H. Forsyth

Mr. Burrowes had been the president of the company since its organization on May 19, 1899, at which time the E. T. Burrowes Company, the Adams & Westlake Company, and the Forsyth Bros. Company, sold out their curtain departments to the new concern which was designated the Curtain Supply Company. Mr. Burrowes was therefore connected with the car curtain industry from its very beginning, being president of the first company that ever put on the market an American car window curtain.

The Q & C Company announces that it has taken over the manufacture and sale of packing and lubricating under the Thomas Smith patents, formerly controlled by B. M. Jones & Co., of Boston. These devices will be hereafter known as the Q & C packing and Q & C lubricating.

R. G. Stutsman, for a number of years superintendent of the frog and switch shop of the Chicago, Milwaukee & St. Paul at Tomah, Wis., and more recently master mechanic of the Four Lakes Ordnance Company, Madison, Wis., has been appointed sales representative of Manning, Maxwell & Moore at Milwaukee, Wis.

Randolph S. Reynolds, assistant to the general manager, was elected secretary at a meeting of the directors, succeeding Holmes Forsyth. Mr. Reynolds has been with the Curtain Supply Company since 1912. Prior to that date he was with the Western Steel Car & Foundry Company, at Anniston, Ala., and with the Pressed Steel Car Company, of Pittsburgh, Pa., having been connected with their purchasing department from 1905 to 1912, at which time he resigned to go with the Curtain Supply Company.

The Driver-Harris Company, Harrison, N. J., announces the election of the following officers: Frank L. Driver, president; Arlington Bensel, first vice president; Leon O. Hart, second vice president; Frank L. Driver, Jr., third vice president; Percival E. Reeves, treasurer; Stanley M. Tracy, assistant treasurer, and M. C. Harris, secretary. Wilbur B. Driver, formerly vice president has retired from active participation in the business.

The Curtain Supply Company, owing to the growth of business and the need of increased space, has leased almost the entire building at 350-356 West Ontario St., Chicago, and will be located there after June 1. The new quarters of the company will be about 50 per cent larger than the old. The building is new and in addition to being equipped with greater and more efficient manufacturing facilities, will have a private track for shipping and receiving freight. For about 19 years this company has been located at 320 West Ohio street, Chicago.

Lieut. Colonel W. R. Roberts

Lieut. Colonel W. R. Roberts, the announcement of whose promotion from Major to Lieut. Colonel in the Construction Division of the United States Army has been previously made, is president of Roberts & Schaefer Company, Chicago. Colonel Roberts has been in engineering construction work for 30 years, and about 20 years ago organized the Roberts & Schaefer Company, which specializes in coal mining plants, coal washeries, coal docks, etc. He is still president of this company, although he has been giving all of his service to the government since last October. The Construction Division of the Army, with which Colonel Roberts is connected, is the outgrowth of the old Cantonment Division which was organized for the purpose of building the 16 National Army camps and the 16 National Guard camps. The variety and character of the work of the Construction Division are much greater than were those of the old Cantonment Division. While the Construction Division is still building some cantonments for the Signal Corps and the Engineer Corps and making extensive additions to all the original cantonments, its most important work at present is the building of large ordnance plants, powder manufacturing plants, Quartermaster Corps terminals, Quartermaster interior depots, many large hospitals, etc. Indeed, this division does all the construction work for the United States and its possessions, for all divisions or bureaus of the Army, and it now has a construction program on hand which amounts to about $650,000,000. It is divided into six branches, engineering, construction, materials and transportation, contract and administration. Colonel Roberts is executive officer in charge of the construction branch, which is the largest and most important branch and which now employs about 200,000 men. Colonel Roberts was a graduate of the University of Illinois. His success in his business, as well as in his new work, has been due not only to his skill as an engineer, but to his ability as a business organizer.

Col. W. R. Roberts

Trade Publications

Tools.—The Warren Tool & Forge Company, Warren, O., has issued a 32-page catalog illustrating and indexing the special line of hand tools manufactured by that company. These consist of picks, crow bars, lining bars, various heavy hammers, axes, rail and tie tongs, wrenches, chisels, etc. Many different forms of each tool are illustrated.

Financial and Construction

Railway Financial News

ATLANTIC COAST LINE.—Frank K. Borden has been elected a director to succeed his father, E. B. Borden, deceased.

CHICAGO, MILWAUKEE & ST. PAUL.—Edward S. Harkness has been elected a member of the executive committee to succeed John D. Ryan, resigned.

KANSAS CITY SOUTHERN.—John F. Harris has been elected a director to succeed Herman Siecklen, deceased.

LEAVENWORTH & TOPEKA.—This 47-mile line, operating between Leavenworth, Kan., and Topeka., which was recently ordered sold for junk by the Federal Court, was purchased at a receivers' sale at Leavenworth, Kan., on May 10, by residents along the road. The sale price was $80,000, of which $25,000 was paid down, the balance to be paid at the confirmation of the sale by the Federal Court.

MISSOURI PACIFIC.—See editorial comments elsewhere in this issue.

NEW YORK CENTRAL.—See improvement budget in another column.

PENNSYLVANIA RAILROAD.—Clement B. Newbold has been elected a director to succeed William H. Barnes, deceased.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has been authorized by the Railroad Administration to resume the construction of the Osage & Santa Fe from Caney, Okla., to Pawhuska. The director general had previously ordered the Santa Fe to discontinue this work.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to E. Otto of Downers Grove, Ill., for the construction of a 10-stall brick roundhouse at Bridgeport, Neb.

CHICAGO & NORTH WESTERN.—This company has completed plans for the north approach of the Orleans Street bridge over the Chicago river, Chicago. The bridge will be built by the city, but the north approach which crosses the North Western tracks will be constructed by the railroad. The North Western has also awarded contracts to the Widell Company, Mankato, Minn.; Gaffin & Gehri, Fond du Lac, Wis., and Adolph Green, Green Bay, Wis., for concrete work in connection with the construction of 35 bridges on various divisions of the road.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company has been granted a permit to build a two-story brick extension to the office building in Nashville, Tenn. The estimated cost of the work is $16,500.

QUEBEC & SAGUENAY.—A contract has been given to O'Brien & Doheny, Quebec, Que., to build a line through St. Francois Xavier, Que., Baie St. Paul, Eboulements, St. Irenee and Murray Bay. The work will be difficult and calls for building a number of temporary trestles, to be later replaced with steel bridges. Track has already been laid on 26 miles.

ENGLISH RAILWAY INVITES SUGGESTIONS.—The London & North-Western Railway has issued a notice in its Crewe works that the company will welcome suggestions for the improvement in methods of manufacture or carrying out work which occur to any of its staff, and in the event of any such suggestion being made use of by the company, and found beneficial, a suitable acknowledgment will be made, and, if desirable, assistance will be rendered towards the patenting of the same, under the usual conditions appertaining to patents taken out by employees of the London & North-Western. In conformity with the notice the directors have recently granted a reward of £5 ($25) to a man in Crewe works for suggesting an improvement to the machine on which he was engaged.—*The Engineer, London.*

ANNUAL REPORT

First Annual Report of Missouri Pacific Railroad Company, Year Ended December 31, 1917

ST. LOUIS, MO., April 15, 1918.

TO THE STOCKHOLDERS:

The Board of Directors herewith submits report of the operations and affairs of the Missouri Pacific Railroad Company, to December 31, 1917.

A summary of results from operations for the year divided between the periods prior and subsequent to June 1, 1917, compared with the year 1916, is as follows:

	January to May, 1917.	June to December, 1917.	Year 1917.	Year 1916.	Increase or Decrease.	Per Cent.
Railway Operating Revenues	$31,126,903.51	$47,193,409.95	$78,320,313.46	$69,972,812.50	$8,347,500.96	11.93
Railway Operating Expenses	21,536,977.47	31,711,060.67	53,248,038.14	51,342,397.05	1,905,641.09	3.71
Net Revenue Railway Operations	$ 9,589,926.04	$15,482,349.28	$25,072,275.32	$18,630,415.45	$6,441,859.87	34.58
Railway Taxes and Uncollectible Railway Revenue	1,471,243.76	2,772,068.46	4,243,312.22	3,103,762.38	1,139,549.84	36.72
Total Operating Income	$ 8,118,682.28	$12,710,280.82	$20,828,963.10	$15,526,653.07	$5,302,310.03	34.15
Non-Operating Income	568,672.97	902,241.34	1,470,914.31	1,443,872.04	27,042.27	1.87
Gross Income	$ 8,687,355.25	$13,612,522.16	$22,299,877.41	$16,970,525.11	$5,329,352.30	31.40
Deductions from Gross Income	†6,340,433.08	6,994,340.57	†13,334,773.65	†16,011,517.31	*2,676,743.66	*16.72
Net Income	$ 2,346,922.17	$ 6,618,181.59	$ 8,965,103.76	$ 959,007.80	$8,006,095.96	.....

* Decrease.

† Included in the interest on funded debt for five months ended May 31, 1917, and for the calendar year 1916, is the interest on bonds in default, amounting to $1,736,601.51 and $4,917,930.00 respectively.

Applying the interest for twelve months of 1917 to the reduced debt basis under the re-organization plan, the net income would have been $10,218,336.94.

Missouri Pacific Railroad Company was incorporated under the laws of the State of Missouri, March 5, 1917, and, with its subsidiary companies, has acquired substantially all of the lines of railroad, franchises and property formerly of The Missouri Pacific Railway Company and the St. Louis, Iron Mountain & Southern Railway Company, which latter Companies were in receivership continuously from August 19, 1915, until June 1, 1917.

Missouri Pacific Railroad Company took over the properties for operation June 1, 1917, at which time there were issued the following securities.

Common Stock	$82,839,500.00	
Preferred Stock (5% Cumulative after July 1, 1918)	71,800,100.00	
Total Stock		$154,639,600.00
First and Refunding Mortgage, 5% Bonds	$46,923,000.00	
General Mortgage, 4% Bonds	51,350,000.00	
Total Bonds		98,273,000.00
TOTAL		$252,912,600.00

These securities were in addition to $125,461,620.00 outstanding underlying bonds and $3,683,000.00 equipment obligations.

CAPITAL STOCK.

No change has been made in the outstanding Capital Stock since June 1, 1917.

FUNDED DEBT.

Equipment Obligations to the amount of $351,000.00 have been retired since June 1, 1917, and in addition, $12,000.00 General Consolidated Railway and Land Grant Bonds have been retired with land grant funds, resulting in a reduction of $363,000.00 in the Funded Debt. Statement on page 17 shows the detail of these reductions. Funded Debt outstanding is shown on pages 18 and 19, and brief descriptions of the various mortgages are given on pages 23 to 29, inclusive.

NEW LINES.

A new line from Dalhoff, Ark., to Camp Pike, Ark., a distance of 4.05 miles was constructed for the purpose of transporting material for the construction of the National Army Cantonment at that point and to afford facilities for the movement of troops and supplies. Minor changes, due to remeasurements and reclassification, increased the mileage 0.94 miles.

The details of charges to Road and Equipment as shown on page 22, summarize as follows:

For Construction of New Lines		$ 176,865.41
For Improvements and Additions to Roadway		1,326,923.71
For Improvements and Additions to Equipment	$2,569,156.48	
Less Credits account of Equipment Retired	254,140.60	2,315,015.88
Total Charge to Investment in Road and Equipment		$3,818,805.00

ROAD AND EQUIPMENT.

The following new equipment has been acquired and taken into the accounts since June 1, 1917, at a cost of $1,893,617.29.

5 Combination Steel Coach and Mail Cars.
6 Dining Cars.
26 Stock Cars.
1500 Coal Cars.
13 Work Cars.

OPERATIONS.

Total Operating Revenues for the year were $78,320,313.46, an increase of $8,347,500.96, or 11.93%. Applied to the average mileage operated, the revenues amounted to $10,691.58 per mile of road, against $9,408.41 the previous year. Freight revenue increased $4,882,206.85; largely due to an increase of 13.11% in the tonnage from Products of Mines, 20.55% in the tonnage of Manufactures, 6.08% increase in the tonnage of Merchandise (less carload freight), and 21.72% in the tonnage of Miscellaneous Commodities. The total tonnage handled increased 9.72%; details of which are shown on page 43.

The average haul per ton of revenue freight was 252.42 miles, as compared with 243.26 miles last year. The traffic statistics on page 41 show material increases in loading per train and per car mile.

Passenger revenue increased $2,880,690.26 or 23.94%; the total amounted to $14,912,672.69, or 19.04% of all Operating Revenues and without any material increase in the average rate per passenger mile. The number of passengers carried increased 13.77%, while the number of passenger miles increased 20.58%.

The total Operating Expenses shown in detail on pages 34 and 35 were $53,248,038.14, an increase of 3.71% notwithstanding large increases in employes' wages and in cost of material. Maintenance of Way expenses equalled nearly $1,500.00 per mile of operated road, and, combined with Maintenance of Equipment expenses, absorbed 29.88% of total operating revenues.

Transportation Expenses show an increase of $4,601,114.37, or 21.18%, with an increase in gross revenue of $8,347,500.96, or 11.93%.

PENSIONS.

To provide for employes who, after long years of faithful service, have reached an age when they are unequal to further performance of their duties, a pension system was made effective July 1, 1917. At the close of the year there had been placed on the pension rolls the names of forty-four beneficiaries.

The productive capacity of the property, now highly improved as a transportation plant, is readily evidenced in the average operating revenues of the last three calendar years, which exceeded the record of the previous three-year period by $10,000,000.00.

B. F. BUSH,
President.

Under a proclamation by the President of the United States the properties were taken over for operation by the Government on December 31, 1917.

GENERAL BALANCE SHEET

DECEMBER 31, 1917, COMPARED WITH JUNE 1, 1917.

ASSETS.

INVESTMENTS:	December 31, 1917.	June 1, 1917.	INCREASE OR DECREASE.
Investment in Road and Equipment	$349,970,917.58	$348,486,781.87	$1,484,135.71
Improvements on Leased Railway Property	3,582.90	3,582.90	.....
Sinking Funds	8,935.75	694.21	8,241.54

LIABILITIES.

STOCK:	December 31, 1917.	June 1, 1917.	INCREASE OR DECREASE.
CAPITAL STOCK:			
Common	$ 82,839,500.00	$ 82,839,500.00	.....
Preferred	71,800,100.00	71,800,100.00	.....
TOTAL	$154,639,600.00	$154,639,600.00	.....

General Balance Sheet continued on next page.

GENERAL BALANCE SHEET—*Continued.*

ASSETS.

	December 31, 1917.	June 1, 1917.	Increase or Decrease.
INVESTMENTS:			
Deposits in Lieu of Mortgaged Property Sold	152,029.86	69,688.67	84,941.19
Miscellaneous Physical Property	2,554,552.51	2,544,455.31	10,097.20
Investments in Affiliated Companies—Pledged	5,304,125.65	5,303,992.00	133.65
Investments in Affiliated Companies—Unpledged	6,181,232.75	3,846,690.53	2,334,542.22
Other Investments—Pledged	15,492,104.47	15,439,664.74	52,439.73
Other Investments—Unpledged	3,500,237.99	3,040,237.99	460,000.00
TOTAL	$383,167,719.46	$378,733,188.22	$4,434,531.24
CURRENT ASSETS:			
Cash	$4,152,978.64	$ 1,470,394.76	$ 2,682,583.88
Special Deposits	504,043.19	57,740.80	446,302.39
Loans and Bills Receivable	10,346.84	5,932.47	4,414.37
Traffic and Car Service Balances Receivable	775,626.62	511,981.53	263,645.09
Net Balance Receivable from Agents and Conductors	2,710,183.98	2,651,356.19	58,827.79
Miscellaneous Accounts Receivable	4,454,413.83	4,229,648.44	224,765.39
Material and Supplies	7,551,261.26	6,059,126.74	1,492,134.52
Interest and Dividends Receivable	49,869.18	35,350.32	14,518.86
Rents Receivable	26,703.20	.....	26,703.20
Other Current Assets	878,451.75	232,992.28	645,459.47
TOTAL	$ 21,113,878.49	$ 15,254,523.53	$ 5,859,354.96
DEFERRED ASSETS:			
Working Fund Advances	$ 58,767.23	$ 60,475.66	$ —1,708.43
Other Deferred Assets	10.28	788.26	—777.98
TOTAL	$ 58,777.51	$ 61,263.92	$ —2,486.41
UNADJUSTED DEBITS:			
Rents and Insurance Premiums Paid in Advance	$ 95,619.33	$ 44,323.47	$ 51,295.86
Other Unadjusted Debits	210,509.83	2,370,401.79	$—2,159,891.96
TOTAL	$ 306,129.16	$ 2,414,725.26	$—2,108,596.10
	$404,646.504.62	$396,463,700.93	$ 8,182,803.69

NOTE.—The following Securities not included in Balance Sheet Accounts:

Securities Issued or Assumed—Pledged	$ 35,000.00	$ 35,000.00	.....

LIABILITIES.

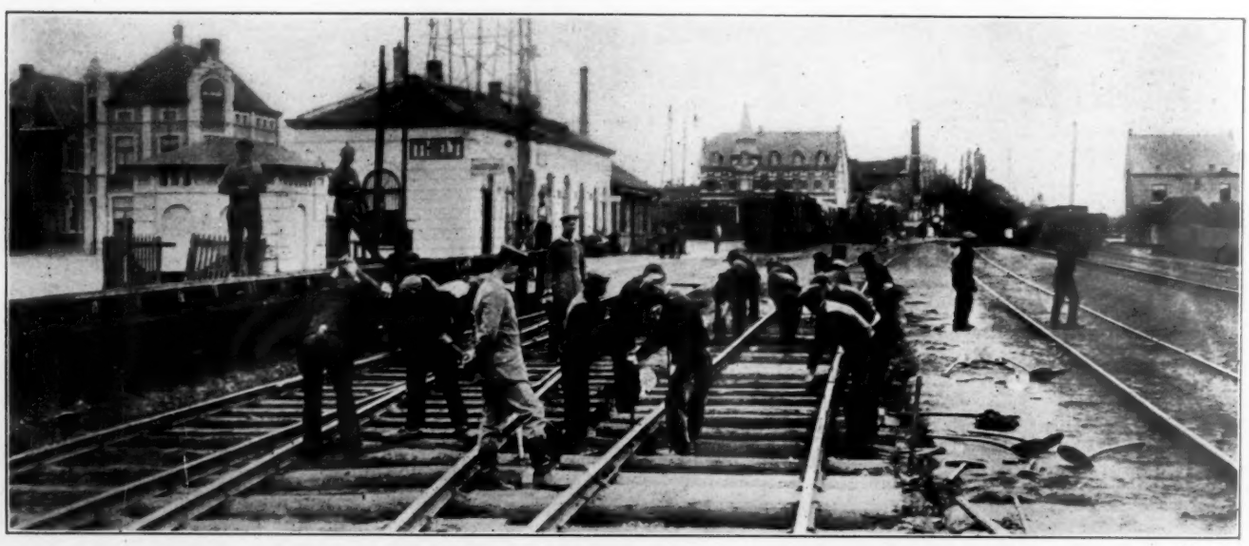
	December 31, 1917.	June 1, 1917.	Increase or Decrease.
STOCK:			
LONG TERM DEBT:			
FUNDED DEBT UNMATURED	$227,054,620.00	$227,417,620.00	$ —363,000.00
TOTAL CAPITAL LIABILITIES	$381,694,220.00	$382,057,220.00	$ —363,000.00
CURRENT LIABILITIES:			
Loans and Bills Payable	$ 70,000.00	$ 620,000.00	$ —550,000.00
Traffic and Car Service Balances Payable	1,980,857.34	2,012,725.23	—31,867.89
Audited Accounts and Wages Payable	5,822,681.93	6,797,510.00	—974,828.07
Miscellaneous Accounts Payable	407,403.92	478,223.34	—70,819.42
Interest Matured Unpaid	1,133,423.49	309,520.00	823,903.49
Unmatured Interest Accrued	2,543,795.60	1,275,238.76	1,268,556.84
Unmatured Rents Accrued	238,796.98	262,659.25	—23,862.27
Other Current Liabilities	1,252,979.66	2,109,754.68	—856,775.02
TOTAL	$ 13,449,938.92	$ 13,865,631.26	$ —415,692.34
DEFERRED LIABILITIES:			
Other Deferred Liabilities	$ 568,289.64	$ 124,690.45	$ 443,599.19
UNADJUSTED CREDITS:			
Tax Liability	$ 823,300.46	.....	$ 823,300.46
Insurance and Casualty Reserves	10,256.78	.....	10,256.78
Accrued Depreciation—Equipment	557,695.39	.....	557,695.39
Other Unadjusted Credits	853,301.66	$ 416,159.22	437,142.44
TOTAL	$ 2,244,554.29	$ 416,159.22	$ 1,828,395.07
CORPORATE SURPLUS:			
Additions to Property through Income and Surplus	$ 18,161.07	.....	$ 18,161.07
Profit and Loss	6,671,340.70	.....	6,671,340.70
TOTAL	$ 6,689,501.77	.....	$ 6,689,501.77
	$404,646.504.62	$396,463,700.93	$ 8,182,803.69

NOTE.—The following Capital Liabilities not included in Balance Sheet Accounts:

Funded Debt Pledged	$ 35,000.00	$ 35,000.00	.....

The capital liabilities shown above include the securities issued under the Reorganization Plan for bonds of various issues dealt with by the Plan, including $7,781,500.00 principal amount, not acquired on December 31, 1917, which are accordingly not shown as liabilities.

[ADV.]



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Belgian Civilians Working on Belgian Railroad Under German Guard

Railway Officers

Executive, Financial, Legal and Accounting

William J. Moody, chief clerk in the treasurer's office of the Erie, at New York, has been appointed an assistant treasurer.

Hale Holden, president of the Chicago, Burlington & Quincy, has also been elected president of the Ft. Worth & Denver City and the Wichita Valley, with headquarters at Chicago.

T. B. Coppage, vice-president and general manager of the Fort Worth & Rio Grande has been appointed terminal chairman at Fort Worth, Texas, under the regional director.

Operating

W. Tansley has been appointed car service agent of the Canadian Pacific at St. John, N. B. succeeding **W. B. Brown,** transferred.

J. F. Blattenburg has been appointed division examiner on the Colorado division of the Union Pacific, with headquarters at Denver, Colo., vice **P. Groome,** promoted.

F. N. Melius, hitherto acting superintendent, has been appointed superintendent of the Hudson division of the New York Central, with headquarters at Grand Central Terminal, New York.

J. J. Donnelly, trainmaster on the Gulf, Colorado & Santa Fe, with headquarters at Temple, Tex., has been transferred to Galveston, Tex., succeeding **E. W. Nettleton,** who goes to Brownwood, Tex., succeeding **W. M. Knowd,** who has been transferred to Temple, Tex., succeeding Mr. Donnelly.

J. T. Slattery, superintendent of the Denver & Rio Grande, Colorado lines, second district, with headquarters at Salida, Colo., has been transferred to the Salt Lake division of the Utah lines, with headquarters at Salt Lake City, Utah, succeeding **E. W. Deuel,** transferred to the Colorado lines.

C. W. Huntington, president of the Virginian Railway, by order of Director General McAdoo, has been retired as chief operating officer of the road, and **Joseph H. Young,** president of the Norfolk Southern, has been appointed federal manager in charge of the operation of the Virginian, effective on May 21, with office at Norfolk, Va.

G. J. Ross, superintendent of car service of the New York Central, lines east of Buffalo, with office at New York, has been appointed superintendent of freight transportation, with headquarters at New York, vice **G. H. Alexander,** and **D. A. Day** has been appointed superintendent of car service, with headquarters at New York, vice Mr. Ross.

M. M. McLearn, chief despatcher of the Canadian Government Railways at Truro, N. S., who was recently appointed assistant superintendent of District No. 2, Eastern Lines, with headquarters at Fredericton, has decided to return to his former position; and **R. Z. Walker,** station agent at Fredericton, has been appointed assistant superintendent, vice Mr. McLearn.

H. R. Saunders, superintendent of the Kansas City terminal division of the Chicago, Rock Island & Pacific has been transferred to Amarillo, Tex., succeeding **J. G. Bloom,** appointed division engineer at Herington, Kan. **G. W. Rourke,** formerly assistant general manager of the Chicago, Rock Island & Pacific, second district, with headquarters at El Reno, Okla., has been appointed division superintendent of the Kansas City terminal division, succeeding **H. R. Saunders.**

A. H. Moll, has been appointed assistant superintendent of the Chickasha subdivision of the Fort Worth & Rio Grande, with office at Oklahoma City, succeeding **J. A. Johnston** transferred to the Oklahoma subdivision with the same headquarters, succeeding **F. C. Glow.** Mr. Glow has been appointed trainmaster of terminals, with headquarters at Tulsa, Okla., in place of **J. C. McGlothin,** resigned. **George E. Dornblaser** has been appointed assistant superintendent of the Cherokee subdivision at Sapulpa, succeeding **D. P. Edmundson,** transferred.

W. L. Jarvis has been appointed assistant passenger trainmaster of the Long Island Railroad; **H. A. Golder** has been appointed assistant passenger trainmaster, having supervision of train service, etc., on the Far Rockaway branch and Rockaway Beach division, and **W. B. Hautsch,** general yardmaster at Bay Ridge, has been appointed assistant freight trainmaster; all with offices at Jamaica, N. Y.

F. E. Williamson has been appointed general superintendent of the New York Terminal District of the New York Central, with headquarters at the Grand Central Terminal, New York. The New York Terminal District will embrace that portion of the Hudson division from Spuyten Duyvil, (New York city) southward to St. John's Park, including freight stations in Manhattan and at Wallabout Basin, Brooklyn, also that portion of the River (West Shore) Division from Little Ferry drawbridge, southward to the junction of the Pennsylvania Railroad south of Weehawken. Mr. Williamson was formerly superintendent of the Hudson division, but for the past year has been acting as general agent at New York city, for the American Railway Association.

James H. Brennan, assistant superintendent of telegraph, of the St. Louis-San Francisco, has been promoted superintendent of telegraph, succeeding **H. D. Teed,** whose death was announced in the *Railway Age* on March 19. Mr. Brennan was born at Marysville, Kan., on September 3, 1873. He began his railway career, on October 1, 1887, in the telegraph department of the St. Joseph & Grand Island at Marysville, Kan., and subsequently entered the service of the Western Union Telegraph Company as telegraph operator at Lincoln, Neb., later going to Kansas City as telegraph operator for the Western Union Telegraph Company and the Postal Telegraph-Cable Company. He afterwards became manager for the Western Union at Las Vegas, N. Mex., and then wire chief at Santa Fe, N. M., Cleburne, Tex., and La Junta, Colo. On December 1, 1906 he was appointed assistant superintendent of telegraph of the St. Louis-San Francisco, which position he held until his recent promotion as mentioned above.

Traffic

G. O. Herbert is appointed demurrage manager of the Missouri Pacific, with headquarters at St. Louis, Mo., effective June 1.

Samuel E. Aliender has been appointed chief special agent of the St. Louis-San Francisco, with headquarters at St. Louis, succeeding **James H. Smith,** resigned.

F. B. Townsend, vice-president of the Minneapolis & St. Louis has been appointed to the staff of **J. G. Woodworth,** traffic assistant to the regional director at Chicago.

W. B. Cornell, district passenger agent of the Chicago & Alton, at Cincinnati, Ohio, has been appointed passenger agent at Springfield, Ill. His former position has been abolished.

Rodney MacDonough has been appointed division passenger agent of the Pennsylvania Railroad and the West Jersey & Sea Shore, with office at Philadelphia, Pa., succeeding **F. B. Barnitz,** who has been granted a furlough.

S. B. Wade, connected with the traffic department of the Chicago & Alton, at Little Rock, Ark., has been appointed traffic agent of the Jacksonville division, with headquarters at Bloomington, Ill. The position he held at Little Rock has been abolished.

E. B. Robb, acting division freight agent of the Canadian Government Railways, with office at Cochrane, Ont., has been appointed division freight and district passenger agent for the Transcontinental division—O'Brien, Que., to Graham, Ont., inclusive, with office at Cochrane.

Gordon M. Craig, assistant general passenger agent of the Erie, with office at New York, in addition to his present duties, will in future have the direction of the suburban passenger traffic, vice **Ralph H. Wallace,** general passenger agent, who has been furloughed for service on the passenger traffic committee of the Railroad Administration for eastern railroads.

Charles M. Burt, general passenger agent of the Boston & Maine and subsidiary companies, with office at Boston, Mass., having been assigned by the regional director, eastern territory, of the United States Railroad Administration, to duty on the passenger traffic committee, **Frederick T. Grant** has been appointed acting general passenger agent, of the Boston & Maine and subsidiary companies, with office at Boston.

J. L. Hayes, commercial freight agent of the Baltimore & Ohio, with office at Baltimore, Md., has been appointed division freight agent, with office at Cumberland, and authority over the Cumberland division, Martinsburg to Grafton, both exclusive, including branches. **P. H. Lantz** has been appointed commercial freight agent, with office at Baltimore, vice Mr. Hayes, and **W. F. Geisert,** traveling passenger and freight agent at Denver, Colo., has been appointed general agent, with office at Camp Sherman, Ohio.

H. P. Cornick, whose appointment as general freight agent of the Louisville & Nashville, with headquarters at Evansville, Ind., has already been announced in these columns, graduated from the high school at Evansville, and began railway work on October 13, 1884 with the Louisville & Nashville as stenographer to the general freight agent of the St. Louis & Henderson divisions. In November, 1892, he was promoted to chief clerk in the same office. On December 1, 1892, he was appointed assistant general freight agent of the St. Louis and Henderson divisions and branches, which position he held at the time of his recent appointment as general freight agent of the same road as above noted.

On May 1, the Atchison, Topeka & Santa Fe, in compliance with orders of the Railroad Administration, closed its off-line freight and passenger soliciting offices. The order caused considerable rearrangement of official positions and in some cases the men affected sought employment elsewhere. **E. F. Lalk,** general freight agent at Pittsburgh, Pa., was appointed assistant manager of the division of transportation of the United States Shipping Board, at Pittsburgh. **S. W. Manning,** general New England agent, at Boston, Mass., received a similar appointment from the Shipping Board at Boston. **R. C. Smith,** general freight agent at Philadelphia has been assigned to government work at Washington. **E. W. Demarest,** general freight agent at Buffalo, has gone to San Francisco, Cal., to engage in the automobile and tire business. **E. C. Kitching,** general freight agent, at Joplin, Mo., is now engaged in the automobile business in that city. **Sam Larimer,** general agent for the passenger department at Des Moines, Ia., has been appointed passenger agent at Wichita, Kas. **W. J. Curtis,** general freight and passenger agent at Salt Lake City, Utah, is now a passenger agent in the general office at Topeka, Kas. **W. S. Farnsworth,** general freight agent at Mexico City, has become identified with the United States Food Administration, in Cuba, in connection with the handling of sugar. **E. H. Dallas,** general passenger agent at Atlanta, Ga., is now located in the traffic manager's office at Chicago.

Engineering and Rolling Stock

G. H. Berry has been appointed assistant master mechanic of South Louisville (Ky.) shops of the Louisville & Nashville, vice **B. E. Dupont,** transferred.

W. Wells, district master mechanic of the Canadian Pacific, with office at Schreiber, Ont., has been transferred in the same capacity to the Farnham division of the Quebec district.

L. G. Curtis, district engineer of the Baltimore & Ohio, with office at Chicago, has been appointed assistant chief engineer in charge of construction, with headquarters at Baltimore, Md.

J. G. Bloom, superintendent of the Chicago, Rock Island & Pacific, with headquarters at Amarillo, Tex., has been appointed division engineer, with headquarters at Herington, Kan., succeeding **S. L. McClanahan,** who has resigned to enter the army, having received a commission as first lieutenant with the 25th Engineers (Railways.)

W. S. Jackson, master mechanic of the Erie at Marion, Ohio, has been appointed mechanical superintendent, with headquarters at New York, to succeed **F. S. Fitzsimmons,** resigned, **R. V. Blocker,** general foreman at Huntington, Ind., has been appointed master mechanic with office at Marion, to succeed Mr. Jackson.

C. E. Smith, consulting engineer at St. Louis and formerly bridge engineer of the Missouri Pacific, has received a commission as major in the engineering branch of the quartermaster's corps. He is now stationed at Washington, D. C.

The Chicago, Rock Island & Pacific mechanical department, in a rearrangment of territories assigned to supervisors of fuel economy, has made the following changes and additional appointments, effective May 15: **J. Benzies,** supervisor of fuel economy of the Chicago terminal, Illinois and Missouri divisions, with headquarters at Rock Island, Ill., will now have charge of the Chicago terminal and the Illinois divisions, with the same headquarters. **P. Smith,** supervisor of fuel economy of the Cedar Rapids, Minnesota, Dakota and Des Moines divisions, with headquarters at Cedar Rapids, Iowa, will now have charge of the Dakota and Des Moines Valley divisions, with headquarters at Valley Junction, Iowa. **F. Meredith,** supervisor of fuel economy of the Iowa, Nebraska and Colorado divisions, with headquarters at Fairbury, Neb., will now have charge of the West Iowa, Nebraska and Colorado divisions, with the same headquarters. **F. Connolly,** supervisor of fuel economy of the St. Louis, Kansas City terminal, Kansas and El Paso divisions, with headquarters at Herington, Kan., will now have charge of the Kansas and El Paso divisions, with the same headquarters. **B. J. Bonner,** road foreman of equipment, with headquarters at Herington, Kan., has been appointed supervisor of fuel economy of the East Iowa, Cedar Rapids and Minnesota divisions, with headquarters at Cedar Rapids, Iowa. **C. W. Reed,** road foreman of equipment has been appointed supervisor of fuel economy of the Missouri, Kansas City terminal and St. Louis divisions, with headquarters at Trenton, Mo.

V. R. Hawthorne, whose election as acting secretary of the Master Car Builders' Association and the Master Mechanics' Association, was announced in the *Railway Age* of May 17, has been serving as temporary secretary of the associations since the death of J. W. Taylor. Mr. Hawthorne was born at Oleona, Pa., on November 27, 1886. He entered the service of the Pennsylvania Railroad as a car repairman at the Elmira, N. Y. shops in June, 1905. He was transferred to the shops at Baltimore, Md., in November of the same year, at which place he was employed during the summer months repairing passenger cars and during the winter as a clerk. Here he gained his first experience in M. C. B. billing. In June, 1910, he was transferred to Williamsport, Pa., as M. C. B. clerk in the office of J. T. Wallis, remaining there until June, 1914, at which time he was transferred to Altoona, Pa., as a gang leader in the M. C. B. clearing house. While there he was appointed on the M. C. B. special committee making time studies. Early in 1917 he was appointed special master car building inspector, reporting to J. T. Wallis, general superintendent of motive power of the Pennsylvania Railroad. He was assigned on special M. C. B. committee work of the American Railway Association in April, 1917.

V. R. Hawthorne

Purchasing

C. C. Keeble, recently storekeeper of the Gulf, Colorado & Santa Fe, at Galveston, Tex., has received a commission as first lieutenant in the quartermaster's corps, at Washington.

Railway Officers in Government Service

H. S. Ray, assistant general passenger agent of the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been commissioned a major in the army and assigned to duty as assistant director of inland transportation, war department.